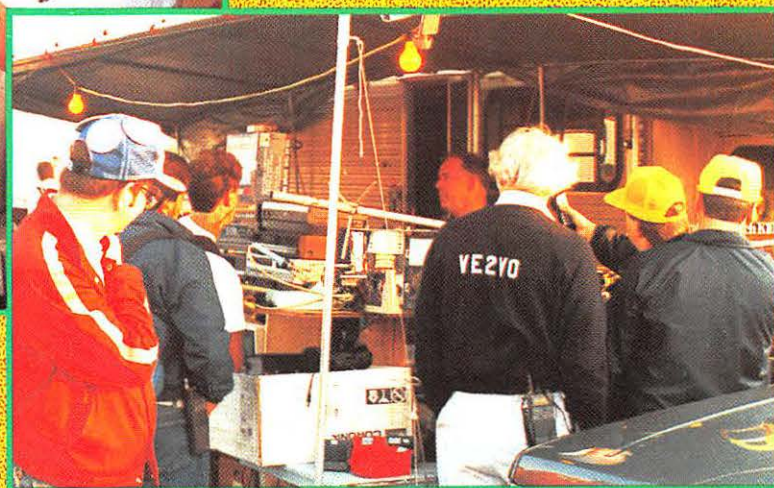
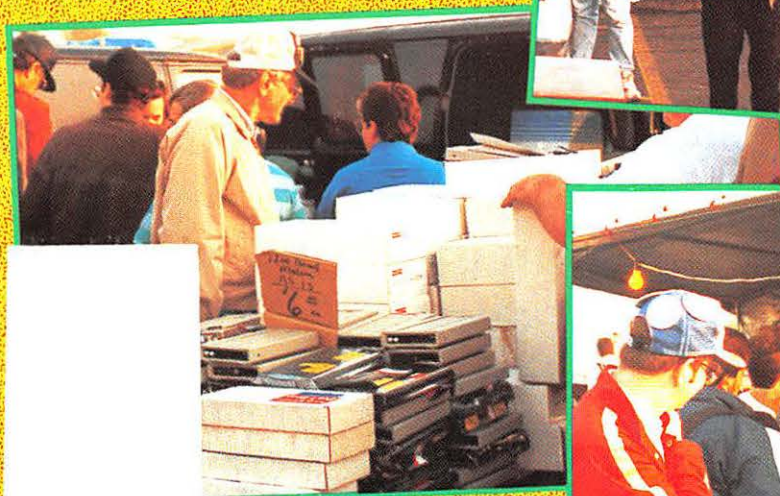
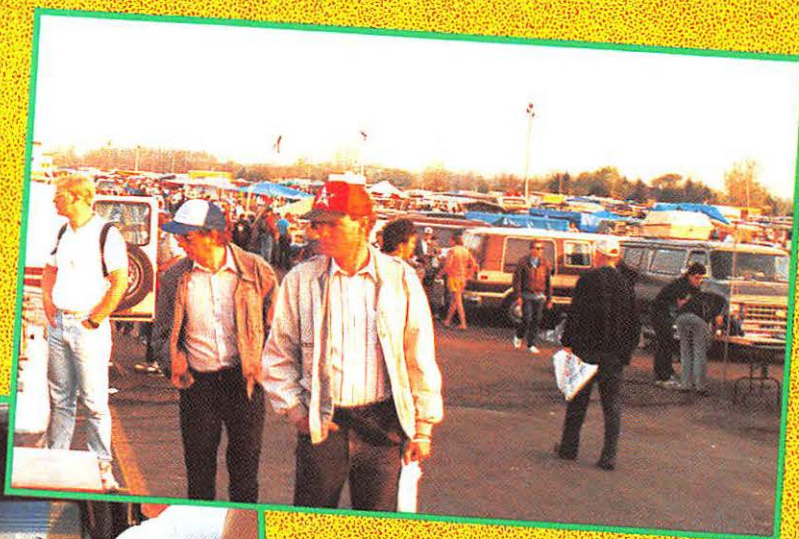


MONITORING TIMES

A Publication Of
Globe Enterprises

*Equipment &
Book Reviews
SW Broadcast
Guide*

HOW To keep your Head at a HAMFEST



Battlefield Communications
Were We Caught with Our Defenses Down?

An Introduction to Radio Beacons

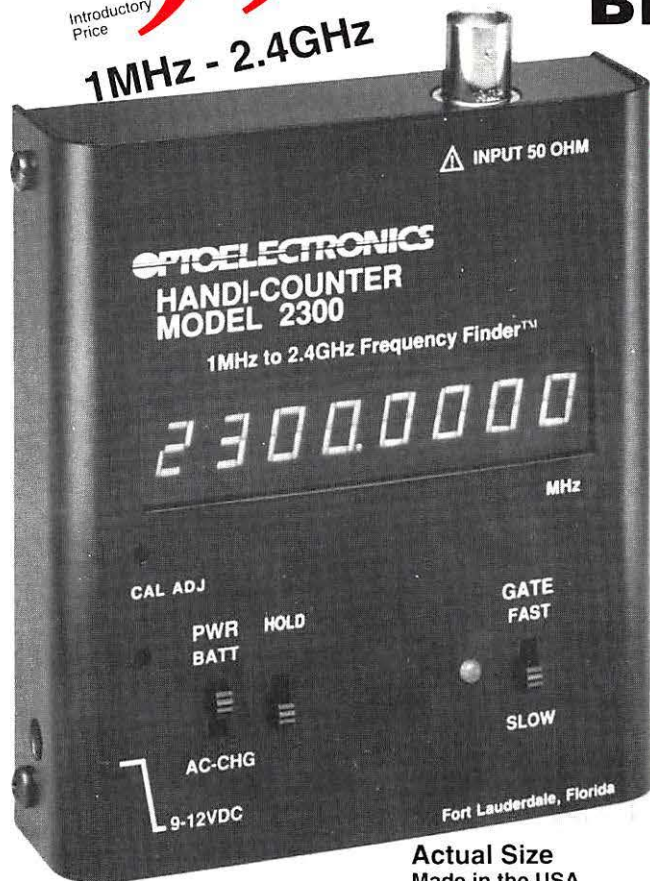


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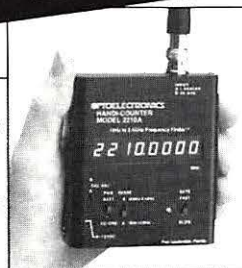
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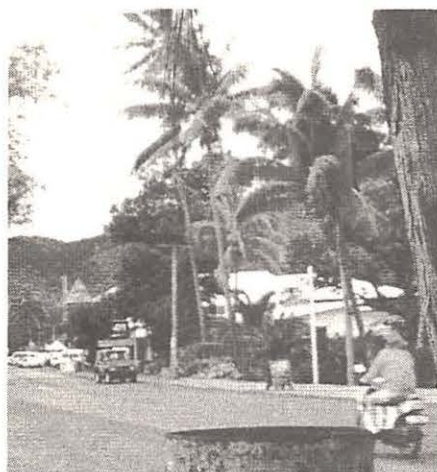
The Hamfest Junkie

by Fred Lloyd

8

Several years after Fred Lloyd got hooked on hamfests, made a shambles of his domestic life and destroyed his budget, he has learned to come to terms with the fact that he is a hamfest junkie. He's learning how to control his habit and to enjoy both buying and selling radio equipment without losing his head. Now he's decided to help others avoid some of the same pitfalls.

For example, how often have you heard: "All the good deals go down before daybreak"? Fred says, not necessarily. Those "good" deals are often made by two groups: ignorant sellers and smart buyers or smart sellers and ignorant buyers. Read Fred's advice and hopefully you'll end up on the smart side.



Radio Cook Islands

by Edward Pyatt

12

If you're dreaming of a place to get away from the hustle and bustle and impersonality of modern life, drift away to the Cook Islands with Edward Pyatt. A small group of islands once belonging to New Zealand, the Cooks depend upon shortwave radio to provide information and cohesiveness to their island nation.

Communications Eavesdropping

by Jack Sullivan

16

Before Jack Sullivan opened his issue of *Aviation Week*, he, like most of us, thought Operation Desert Storm was a complete military success. It was. But the disturbing report of how much of our communications the Iraqis did manage to intercept and understand led Jack to explore what may have been the weakest link in our defenses: secure communications.



COVER PHOTOS: Dayton Hamvention by Norman Schrein.

Things That Go Beep in the Night

by Kevin Carey

20

When someone mentions "beacon," I immediately think of the thrill as a child of seeing the beacon lights sweeping their arched path through the air from the tower on top of the hill. Radio beacons serve much the same purpose, and can even evoke similar emotions.

Kevin Carey has been DXing these residents of the low bands and has developed a fondness for the steady signals that keep our ships and planes on course.

One Man's Opinion

by John Henault

24

And More . . .

Summer time changes our listening interests to more outdoor activities. Utility World (p.30) provides updated frequencies for listening to the Coast Guard, always exciting listening as recreational boating picks up. You'll find more maritime updates in High Seas (p.46). In unusual weather conditions, don't forget about monitoring local fire, police, and utility maintenance crews for information and excitement as well (p.34).

A recent, and possibly the best low-cost travel portable has been released by Panasonic -- the RF-B45. Magne reviews this one (p.88) just in time for your vacation.

The focus is on CTCSS (Continuous Tone Coded Squelch System) this month. Bob Grove reviews the AIE Tone Finder, a companion to the BC760XLT scanner (p.90), and new Experimenter's Workshop columnist Bill Cheek explores how to modify any scanner to discriminate between the encoding tones (p.94).

Search our pages and you'll find even more. Federal File goes under the skin of the National Security Agency to see how intelligence-gathering is conducted (p.44); Uncle Skip has drawn a deep breath and tackled the subject of propagation (p.42); there are things to build and SW broadcast stations to tune in. So go to it!

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LETTERS

This month we acknowledge several comings and goings here at *Monitoring Times*. It's time to give an official and personal word of farewell to Larry Miller, who has been managing editor of our magazine since the July issue of 1986. Exactly five years ago *Monitoring Times* incorporated Miller's expertise on shortwave broadcast listening to make *MT* the most comprehensive radio hobby magazine on the market.

Many current *MT* readers have followed him from his former publication, *International Radio*. Although we are all sorry to see Miller depart, his leadership has provided a creative direction for *Monitoring Times*, and has established it (as Jane Pauley reported) as "the bible" for radio monitors.

Having been in almost daily phone contact with Larry for five of my nine years with *MT*, I will miss him as part of the editorial team, but I am glad he will continue to lend his creative talents to our hobby. Larry is editor of *MT*'s "Communications" and "What's New?" columns and will be contributing occasional features; he continues to sell radio related books through DX Radio Supply and edits the new scanner magazine, *National Scanning Report*.

Speaking for myself, Bob Grove, and all the staff, we have all grown from our association together and we thank you, Larry, for your dedication and devotion to *MT*.

In the never-ending cycle of change, we are glad to welcome two new columnists to the staff this month. Taking the position of columnist for "Below 500 kHz" is Kevin Carey, technical writer for an electronics firm. Kevin's interest in low band was piqued when he wondered why the tuning on most radios ended abruptly at 500 kHz. His fascination with this seemingly obscure band has continued ever since. For those of you unfamiliar with the band, Carey's feature article on nondirectional beacons is an excellent starting place.

Have an equipment problem or a modification that might be of interest to other readers? Bill Cheek is your man. We are honored to have the author of the *Scanner Modification Handbook* as editor of "Experimenters Workshop." Reader Albert Steigler, Jr, sent us an endorsement recently after having his PRO-2006 modified by Bill, saying "Mr. Cheek ... really knows his scanners."

He really knows his radios, period. And if he doesn't, he's willing to poke around and find out.



Riyadh, Saudi Arabia: This AWACS pilot has taken his Sony 2001 with him for the past eight years to keep up with the news, probably the "subversive" BBC World Service (See page 100).

"What is happening to the government in this country?" wonders Joseph Sinnott of Florida in a letter to his Congressman. "As the authoritarian governments in Eastern Europe relax their grips on their people, our government is taking away personal freedoms at an alarming rate, as this proposal [FCC PR Docket 31-36] illustrates."

"Rather than penalize some 260 million Americans [ham transceiver and scanner owners], it would be better to have those who require secrecy in communications to install scrambling circuits in their equipment," says George Papalias of California. But he continues, "Do you remember how the FCC handled the problem of high powered 10 meter linears not falling into CB hands? Right, the linears were banned and the hams were included in this ban."

Well, the comment period is now closed regarding the FCC Notice of Inquiry concerning the feasibility of removing public safety frequency coverage from amateur transceivers. *MT* filed its opposition to such restrictions for several reasons, including:

- Such receivability during disaster and emergency communications allows ham radio to provide a vital link among public safety, relief agencies and the affected population.
- Public safety radio equipment which has amateur radio frequency capability remains unaffected, rendering the entire Notice of

(Please turn to p. 100)

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FCC to Gain Former Federal Frequencies

Up to 200 megahertz of spectrum formerly allocated to the federal government may be reassigned to the civilian sector in an effort to ease the radio overpopulation by FCC licensees riding the crest of the wave of new technologies.

Championed by Rep. Edward J. Markey (D-Mass.), the bill passed the House Energy and Commerce Committee unanimously, but the feds are determined to fight the reallocations, hoping to reach a middle ground by surrendering some frequencies while sharing others. Final Congressional action on the proposal is expected by the July 4th recess.

It is unlikely that the frequency switch will affect the listening habits of shortwave or scanner hobbyists; most of the frequencies will probably come from the microwave range between 1 and 5 GHz (1000-5000 MHz).

Even after final resolution, the Department of Commerce will have two years to compose a list of discrete frequencies and the FCC will have 15 years to allocate their uses, awarding licenses by comparative hearings, by lottery (which has led to abuse by speculative investors in the past) or by auction.

Kol Israel Slashes English Broadcasts

In a surprise move, Israel Radio is scheduled to shut down its English services -- everything except the 2130 UTC transmission to Europe (check the *MT SW Guide* for frequencies).

Lost will be English to Australia, New Zealand, Asia, Africa and the Americas. Also on the chopping block were certain foreign language broadcasts as well. Final transmissions were to occur on June 1st.

The station began warning listeners during May of possible severe cutbacks. Announcer Ben Dalfen reportedly suggested that listeners go out and buy a timer and a tape recorder and listen to the European broadcast -- a suggestion that was met the next week with angry letters and even donations.

Some sources familiar with the station express puzzlement at the cutbacks saying that the station recently purchased new antennas. Others say that the cutbacks were

necessary to fund domestic stations designed to help the flood of new Russian and Ethiopian immigrants integrate more easily into Israeli society.

Israel Radio was funded by the Jewish Agency as the Voice of Zion to the Diaspora which encouraged immigration to Israel in the 1950s. By the mid-1970s the station had greatly increased in size, broadening its appeal to non-Jews as well.

While most seem to indicate that a reversal of the transmission slashing is unlikely, a letter-writing campaign might be helpful. Direct your letters to Victor Grayewsky, Director General, Israel Radio International, P.O. Box 1082, Jerusalem 91010.

Feeding the FCC

Federal Communications Commission Chairman Alfred Sikes has asked the House and Senate appropriations committees for \$133.4 million in funding for the agency in fiscal year 1992. The figure represents a 15% increase over the Commission's current appropriation.

About half of the \$17.6 million dollar boost would go for non-discretionary spending, such as increased employee compensation and to cover higher operating costs.

In addition, the agency proposes to add 38 additional employees and upgrade the 24 year old computer system. Some of the FCC's equipment, said Sikes, "is literally older than the technicians who operate it."

Goodnight, Pooh

Scott Lovett and Scott Gallagher knew that they were in trouble when they saw two men trace the transmitting cable from their antenna across the sky to the attic studio of their pirate radio station, WHDL. Goodbye 102.1 FM. Hello FCC.

WHDL, which reportedly stood for "We Had Hot Dogs for Lunch" was a nine year old evenings-only talk radio station with rock music and weather reports delivered by some of the Boston area's top broadcasting personalities, most of whom never knew that they were on the air. Lovett and Gallagher telephoned them at their offices, asked what the forecast was, and taped their response.

The 80 watt station plugged anti-smoking, anti-drinking spots and often put Braintree, Massachusetts, area high school students to bed with readings from "Winnie the Pooh."

"Someone had called us, amused by the station, and asked if it was licensed," said FCC agent Vince Kajunski. There were no complaints of obscenity, something Kajunski called "lucky." The fine was \$750 -- it could have been \$10,000 and a year in prison, he said.

"But at least we're not off to jail," Lovett said. "Explaining our offense to rapists and murderers would have been a challenge."

TV Marti: Grounded

The Voice of America's TV Marti has had its share of problems. Aimed at Cuba, it is generally considered controversial, even ineffective by some. Bush administration officials counter that it is the only TV medium

King Juan Carlos & Queen Sofia of Spain dedicate a new Radio Exterior relay site in Costa Rica (See page 26).



Tico Times photo

COMMUNICATIONS

by which Cubans can get uncensored news and information.

Then came the crash. In mid-January, the balloon carrying the station's transmitter broke loose from its tether and landed on the southernmost tip of south Florida. TV Marti was off the air until late March.

During the time the balloon-station was off the air, the Voice of America apparently rented time on Key West TV station WETV. Now comes word that TV Marti may have its feet firmly planted on the ground. So impressed were VOA officials with WETV that they bought the station. The cost to taxpayers: \$1.3 million.

No-Go Cellular

Wladimir Naleszkiewicz, the former head of Genesis Enterprises, Ltd., has been handed a \$5,000 fine and sentenced to four months of home-confined work release by the U.S. District Court for the Eastern District of Virginia.

According to reports, Genesis Enterprises, Ltd., failed to file applications to win cellular rural service areas for various clients in January 1989, allegedly because the firm couldn't pay the \$200.00 filing fee. Genesis reportedly continued to send letters to clients assuring them that their applications had been filed with the FCC.

Money Down the Drain

Remember the Russian woodpecker? This annoying radio signal was the byproduct of the Soviet's Over-the-Horizon-Backscatter radar, an early warning system using ionospheric signal reflection.

The U.S. Air Force has spent 20 years and \$1.29 billion developing its own OTHB system on both U.S. coasts, and now that they are completed, they are slated to be mothballed. In a cost-saving move, both east and west coast sites were to be closed down, able to be returned to service within six months if needed.

However, the Maine congressional delegation, in response to budgetary constraints and the changing political situation, is trying to negotiate a compromise. If their proposal is approved, the site in Bangor, Maine, which covers 4.8 million sq. mi. of airspace between Cuba and Greenland, would be operated 8 hours per day, five days

a week by National Guard personnel.

The Navy has its own similar system in Amchitka, Alaska.

Own More Radio Stations

If you already own the legal limit of radio stations in the United States, we may have good news for you. The Federal Communications Commission has proposed a relaxation of the rules that govern how many radio stations a licensee may own.

One proposal calls for allowing a single owner to own an unlimited number of AM stations but no more than the current limit of 12 FM stations. Other possibilities offer similar solutions.

The Commission's actions were applauded by the National Association of Broadcasters (NAB) who said that "radio has changed dramatically over the past decade...[and that] a re-examination of the radio ownership rules is clearly in order."

Jeff Chester, director of Ralph Nader's Teledemocracy Project objected strongly saying that "The Commission's intention is to sweep out the handful of rules designed to protect the public from potential abuses of power."

Andrew Schwartzman, executive director of the Media Access Project, took a similarly dim view, saying that the proposed changes are "very dangerous...and sound suspiciously like the approach that has led to the disaster in the banking and savings and loan industries."

Current FCC rules generally prohibit common ownership of more than 12 AM and 12 FM stations, or of more than one AM and one FM station in the same area.

A Nose for News

Thanks to those of you who recognize a story when you see it: this month, Steve Kimmel of Glendale, Arizona; Lewis Miller of Reading, PA, Larry Ledlow, New Hampshire, and anonymous contributors. We welcome your clippings, photocopies, industry publications, etc. that contain items of interest to our readers. If it looks interesting to you, send it to Communications, P.O. Box 98, Brasstown, NC 28902. Who knows, it might make the news!

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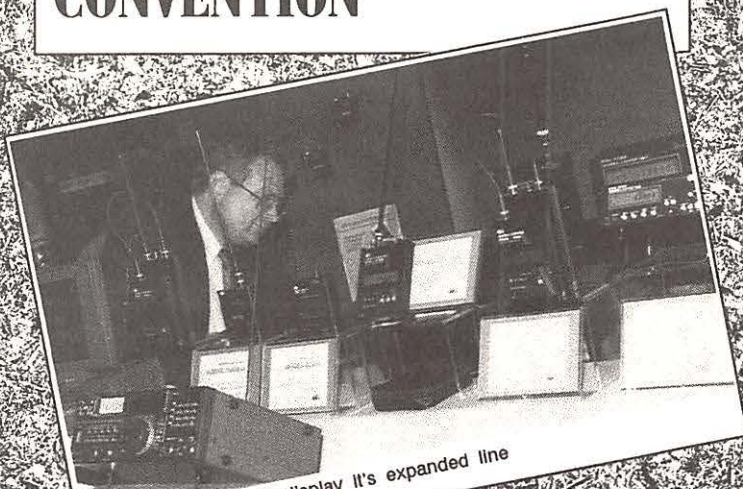
Glossary

Most abbreviations and "radio shorthand" terms will be explained in the article in which they are used, but following is a list of terms and abbreviations you will find frequently in our pages. We hope you will find it useful.

AFB	Air Force Base	LORAN	Long Range Aid to Navigation
AFRES	Air Force Reserve	LSB	Lower sideband
AM	Amplitude modulation (transmission mode)	MARS	Military Affiliate Radio System
AMVER	Automated Merchant Vessel Rescue System	MF	Medium frequency; includes standard AM broadcast band (300 kHz-3MHz)
ANG	Air National Guard	MHz	Megahertz (1,000 kHz)
ARRL	American Radio Relay League	MOA	Military Operations Area
ARRS	Aerospace Rescue and Recovery Service	MUF	Maximum usable frequency
ARTCC	Air Route Traffic Control Center	NASA	National Aeronautics and Space Administration
ATC	Air Traffic Control	NG	National Guard
AWACS	Airborne Warning and Control System	NNNN	End of RTTY message
Baud (Bd)	Bits of data per second	NORAD	North American Aerospace Defense Command
BBC	British Broadcasting Corporation	NRC	National Radio Club
BFO	Beat frequency oscillator (for reception of CW, RTTY, etc.)	Op(s)	Operation(s)
CAP	Civil Air Patrol	PFC	Prepared form card
Comm	Communication	QRM	Noise or interference
COMSTA	Communications station	QSL	Station's verification of a reception report from a listener
CQ	General call to anyone monitoring, inviting reply	QSO	A two-way communication
CW	Continous wave (Morse code)	RAAF	Royal Australian Air Force
DE	(French) "from"... ID or call sign	RAF	Royal Air Force
DOD	Department of Defense	RTTY	Radioteletype
Duplex	Two-way communications using two different frequencies.	SAC	Strategic Air Command
DX	CW abbreviation for distance	SAR	Search and rescue
DXer	One who listens to distant stations	SASE	Self-addressed stamped envelope
EAM	Emergency action messages	SATCOM	Satellite communications
ECPA	Electronic Communications Privacy Act of 1986	Simplex	Two-way communication using one frequency
FAX	Facsimile	SINPO	A signal-quality rating system (1-5) on each of the following characteristics: strength, interference, noise, propagation, overall quality
FCC	Federal Communications Commission	SSB	Single sideband
FEMA	Federal Emergency Management Administration	SW	Shortwave
FM	Frequency modulation (transmission mode)	SWBC	Shortwave broadcast
GCCS	Global Communications and Control System	SWL	Shortwave listener
GMDSS	Global Maritime Distress and Safety System	TAC	Tactical Air Command; tactical
HF	High frequency; shortwave (3-30 MHz)	TFC	Traffic (communications)
Hz	Hertz: unit of frequency (formerly cycles per second)	UHF	Ultra-high frequency (300-3,000 MHz)
ID	Identification	USAF	United States Air Force
IF	Intermediate frequency	USB	Upper sideband
IRC	International Reply Coupon (available from post office)	USIA	United States Information Agency
ISB	Independent sideband	USCG	United States Coast Guard
ITU	International Telecommunications Union	USCGC	United States Coast Guard Cutter
kHz	Kilohertz (1000 Hertz)	USMC	United States Marine Corps
kW	Kilowatt	USN	United States Navy
LCD	Liquid crystal display	UTC	Coordinated Universal Time-- The time at 0° longitude
LED	Light emitting diode	Ute	Slang for utilities (2-way comms)
LF	Low frequency (30-300 kHz)	VHF	Very high frequency (30-300 MHz)
		VLF	Very low frequency (3-30 kHz)
		VOA	Voice of America
		VOLMET	(French) "flying weather"
		WARC	World Administrative Radio Conference
		wpm	Words per minute (usually used w/ Morse or RTTY)
		WX	Weather
		YL	"Young lady," female operator

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6:30 to 6:45 PM

WELCOME AND SPEAKER INTRODUCTION

7:00 to 8:00 PM

EVENING SEMINARS

Military Monitoring
with Larry Van Horn
and Jack Sullivan

**Cellular Surveillance
Techniques**
with Tom Bernie

QSLing
with Gerry Dexter

8:15 to 9:15 PM

Computers in Radio
with Jim Frimmel

Satellite Monitoring
with Ken Reitz

**Construction of a
Shortwave Station**
Slide Show from WWCR

Saturday, October 5

8:00 to 9:00 AM

REGISTRATION.

TOURS BEGIN: 911,
Channel 6 TV Station.
SPECIAL ATTRACTION:
Life Star Helicopter

9:00 AM

EXHIBITS OPEN, SEMINARS BEGIN

Utilities Monitoring
with Larry Van Horn

Used Equipment Buying
with Fred Osterman

Beginner's Antennas
with Bob Grove

10:15 to 11:15 AM

Scanning--Back to Basics
with Bob Kay

Shortwave Listening
Staff

Beginner's Utilities
with Larry Van Horn

11:30 to 12:30 PM

Unlicensed Broadcasters
with John Santosuosso

Scanners--Past & Present
with Bob Grove

Beginner's Receivers
with Larry Magne

2:00 to 3:00 PM

Aero Listening
with Jean Baker
and Jack Sullivan

**VHF/UHF
Communication Systems**
with Gene Hughes

Beginner's Q & A Forum
with Skip Arey

3:15 to 4:15 PM

**Choosing a Shortwave
Receiver**
with Larry Magne

Electronic Surveillance
with Howard Perry

Beginner's Aircraft
with Jack Sullivan

4:30 to 5:30 PM

Experts Forum
Group Q & A

5:30 to 7:00 PM
SWAP MEET

6:00 PM
EXHIBITS CLOSE

7:00 to 9:00 PM
BANQUET
Guest Speaker,
Larry Magne
Publisher, "Passport
to World Band Radio"

9:30 PM
**HIDDEN TRANSMITTER
HUNT**

Sunday, October 6

9:30 to 10:30 AM

**Who's on the
Radio Spectrum**
with Bob Grove

**Choosing a Shortwave
Receiver**
with Larry Magne
(repeat of Sat. 3:15)

Beginning Ham Radio
with Skip Arey

10:45 to 11:45 AM

Utilities Monitoring
with Larry Van Horn
(repeat of Sat. 9:00)

Listening Laws
with Frank Terrenella

12:00 to 1:00 PM
Tips and Techniques
with Bob Grove

*Headed for a hamfest this summer?
Whether buying or selling, follow these
rules of thumb from one who ought to know:*

The Hamfest Junkie

by Fred Lloyd, AA7BQ

Sometimes, a friend outside the radio hobby will ask me, "What is a hamfest?" My usual response is, "Well, it's basically a flea market where electronic and ham radio stuff is sold". How deceptively simple!

Of all the amateur radio activities that I participate in, none gets me more excited than a good, old fashioned hamfest/swap meet. My first swap meet was the famous Foothills Flea Market, which is held once a month during the summer in Silicon Valley.

Just like the pusher who sold the addict his first fix, the Foothills swap meet has left me forever addicted to the art of buying/selling/trading ham equipment. I'm now destined to return time and time again to fulfill what has become an insatiable appetite for the "junk" bargain of the century.

After some two years of this activity, I've finally overcome the denial phase and am beginning to come out of the closet as a self affirmed and publicly confessed, "junkie." Now that I've been exposed, I'd like to share what I've learned with others so that they may profit in both fun and dollars and perhaps avoid some of the pitfalls that I've inadvertently discovered along the way.

There are basically two kinds of junkies: buyers and buyer/sellers. Most if not all buyer/sellers started out as simple buyers and like myself, graduated to the dual mode role.

No doubt many readers of this article will have attended swap meets themselves and they probably will have heard several "rules of thumb" on how things are done and where the bargains are. Let's talk about some of these rules and about a few others that I've learned on my own.

"Get there early because all the good deals go down before daybreak."

Well, yes and no. Those "good" deals that go down early are often made by two groups: ignorant sellers and smart buyers, or smart sellers and ignorant buyers. Hopefully, you will be on the buying end of the former group. And hopefully, you'll be on neither end of the latter.

The ignorant sellers are those who are offering a TS-940 for \$400. They simply don't know what their stuff is worth and since they

haven't toured the grounds yet they're not likely to find out. Should you take advantage of their ignorance? Well, if you don't then someone else surely will.

Watch out for basket cases. Don't hesitate to ask the big question, "why are you selling it?". Pay close attention to lots of uh's and er's in the answer.

How many really hot, smoking deals on late model, expensive gear are out there to be had? Once in a while one comes along, but on the overall, few if any. Most hobbyists know what they have, know what they paid for it and know what it's worth today. If you hear a fantastic deal such as "I'm selling this 940 for \$400 because I just want to get rid of it..." then buyer beware. There is no free lunch - if it looks too good to be true than chances are it is. The best value deals will generally be on equipment that is 5 to 10 years old.

Ignorant buyers are those who blindly believe that "the best deals are the early deals" and are predisposed to spending their money no matter what. They will probably buy the first piece of equipment they see which remotely resembles their wants and needs.

An informed buyer will have cased the entire swap meet at least once before making an offer on anything. Some buyers will even come out with flashlights as the sellers are unloading their cars hoping to find that elusive bargain. Personally, I prefer daylight to flashlight if I'm

going to spend anything over \$100. I really have to SEE it first.

Experience has shown that prime time at most swap meets is between 8 and 10 AM. Swap meets which start earlier sometimes do some business before 8 but the real crowds, and the real competition (both buying and selling) happens during prime time. Prices never go up as the day wears on, they only go down.

Another "great deal" time is also at or near the close of the event. You can often prey on seller desperation by waiting until nearly closing time or until he's packing up before submitting your insultingly low offer. If he's hungry, he might just take it.

Also, many sellers revert to giving things away rather than cart them home. I've picked up - and disposed of - some good stuff this way.

*"I've got a few things to sell.
How do I set up a booth?"*

A few basic tips: Try not to look too professional and try not to look too naive. If you look like the sidewalk sale at K-Mart then many buyers will peg you as a pro and will walk right on by.. If you have your junk heaped in a pile on the ground you'll get plenty of lookers rummaging through it but don't expect to make any money. Try for a middle-ground, soft sell approach.

Avoid prepackaged and shrink wrapped items. Avoid store bought price stickers. Arrange your merchandise so that people can easily touch



Bob Grove

it and gather around it. If you have original equipment boxes, keep them visible but off of the main display (looks too professional).

Don't use a cash box or register. Avoid big, fancy printed signs and advertisements - neat, handwritten notes on index card sized pieces of paper look more sincere. Do everything you can to have at least one other person helping you. You'll need this person to take over for you so that you can do some buying yourself and to perform the necessary recon to check your prices.

Don't expose yourself to petty thieves. Expensive handhelds should be kept visible but just out of easy reach. At a recent hamfest in Flagstaff, one guy stepped up to a commercial display and picked up an IC-24AT and began looking at it. A few minutes later the clerk noticed something awfully strange: the IC-24AT has metamorphosed into an old, beat up, IC-24AT!

Some dealers don't open their booths until after they've had a chance to go shopping first. Some of these guys are very shrewd and will go around buying up a lot of things which will then show up for sale in their booths a little later in the day. I suppose that there's nothing much one can say about this sort of thing but it does tend to rub me the wrong way. Needless to say, these guys are sharks.

"How about pricing and haggling?"

Make no bones about it, you're in a flexible price environment. Both buyer and seller alike are aware of this, and it's expected. Many people won't buy regardless of the price unless they can negotiate for some kind of discount. I've come down as little as five percent to make a sale which wouldn't have been made otherwise. Buyers want a deal, regardless of the price.

Never, ever, price your for-sale item at your minimum price. Avoid the use of the word "Firm" in your pricing. You can keep the "firm" or lowest acceptable price in your head. If you don't like to haggle, then don't expect to sell much, or if buying, expect to overpay.

Don't be insulted by a 50 percent offer on your asking price - it's a typical ploy. A large percent of such offers really mean "I'll give you 75 to 80 percent of what you're asking for." Don't shut your bidder off with a blunt "no" response - unless it's so ridiculously low as to be obviously insincere. Do your best to counter any offer you get. You must show at least a willingness to concede something.

Research your prices before the event. New gear less than a year old typically loses about 20 to 30 percent of its value - Sorry, but it's a fact of life. Nobody is going to buy your "mint" condition rig on a 10 to 15 percent discount off

of list. Get the Amateur Electronic Supply catalog (4828 W. Fond du Lac Ave., Milwaukee, WI 53216) - it's the pricing bible for new and late model gear.

Gear that's between two and five years old is typically worth between 50 and 70 percent of its original purchase price. Don't bother consulting those fictional manufacturer's "list" prices, as everybody knows that they're just hype. Older gear is priced at roughly 30 to 50 percent of what comparable new gear would cost. For example, a Kenwood TS-520 (non digital) will go for around \$300 while a new TS-140 is about \$750.

A note about options such as CW filters, PL encode/decode modules, desk microphones, and other add-ons: sadly, they plummet in value much more rapidly than the gear to which they're attached. When the prospective buyer looks at a piece of used gear, the options add only about 30 percent of their original value to the price, regardless of the age of the equipment.

For example, a PL decode unit might cost you about 80 dollars new. It won't, however, add anywhere near \$80 to the resale value of the rig. This is especially true for hand-held (HT) accessories. \$150 dollars of HT accessories will be lucky to net you \$50 dollars in resale - when sold along with the rig. Selling them separately does no better; you lose either way.

There are a few brand names which hold their prices better than others. For HF gear, the Big Three (Icom, Kenwood and Yaesu) hold value over time the best. In used rigs, Collins is the all time leader in resale value retention. Don't get suckered into paying too much for a Collins, because for the same money you could probably buy a brand new transistorized (and



Skip Arey

WARC capable) rig from one of the Big Three. Drake has a brisk second hand market, especially the newer models.

Forget about Swan, Eico, Gonset, most Heathkits, Atlas, Galaxy, and most of the all-tube rigs (except Collins). Lovers of these older rigs please don't take offense, I'm simply stating that their resale values don't hold up very well.

In the classic arena, Hallicrafters, Hammarlunds, Johnsons and National's seem to be quite well liked. Each brand has a range of models ranging from CB-style cheap to broadcast or mil-spec quality. Prices vary with function, condition, and sentimental value to the current owner.

When selling new, late model gear, some buyers may grunt that your price is too high and that with a new one they can get a warranty. I've successfully countered this argument - and won - by offering to warrant the unit to the buyer myself. It works! This shows that you're 100% confident in the equipment and that it's worth every penny of your asking price.

Equipment for the Non-Ham

At a swap meet you will find radio and electronic gear of interest to radio enthusiasts of all persuasions. Older ham receivers are just as valuable to the HF monitor as to the ham. Besides the AES catalog referred to in the article, you can find information on older receivers in the "Ham Equipment Buyers Guide" from Barbara Brand Wixon (189 Kenilworth Ave, Glen Ellyn, IL 60137), and on Hallicrafter receivers from Chuck Dachis (4500 Russell Drive, Austin, TX 78745).

You will find scanners, CBs, and short-wave sets as well at most of these meets. For help in pricing used equipment Grove Enterprises has put together a Pricing Guide for Used Scanner and Shortwave Receivers (\$5.95 incl. shipping. P.O. Box 98, Brasstown, NC 28902).

Here's a potpourri of miscellaneous observations about buying and selling:

Don't bother with Old Timers who only have one thing to sell. It's usually their dearest old HF rig that they bought new in the mid-70's. You can bet that it's overpriced, and that he really doesn't care if he sells it or not. Yes, we know that it's unmodified, that it's been meticulously fed and cared for, that it has the original cartons, manuals and sales receipts, and that he's damned proud of it. But remember: It's still a used rig that's worth the prevailing used price plus at most 10 percent more for being in excellent condition.

If you're a seller and things are moving really fast, and/or people don't seem to be haggling much, then take note - you're underpricing your merchandise. Don't wait until you're almost sold out to realize this. If you have

several of the same item, try to hold a few in reserve for this contingency. If you show a box full of 100 of the same widget, the seller will offer you less than if you only had one or two on display.

Never get sentimental or emotionally attached to any item. This killer attitude can cost you big \$\$\$.

Find out if the seller is a local ham or not. Bluntly, local hams or hobbyists are less apt to stiff people who might hear them on local repeaters or show up on their doorstep. It's one of the peculiarities of this hobby - people talk. It can help you and it can hurt you. If you take advantage of people, or if you misrepresent your wares, you'll soon be persona non grata both on the air and around town.

Rigs which come with service manuals: This definitely means that the owner was a tinkerer. It could mean that the rig has or had serious problems. It might mean nothing - it's just something else to think about.

When buying old, tube-type gear, be especially cautious of those which utilize TV

sweep tubes in the finals - most of them stink. Even Heathkit used 6146's (as did Collins), which are a good indicator of a robust design. When these types of rigs were designed, TV sweep tubes were intended to be a more cost effective solution.

Today, sweep tubes cost just about as much as 6146's and so the intended savings is lost. In fact, you'll likely blow two or three sets of sweep tubes before you'll put a dent in a 6146. Just look in an old tube manual (boy, I'm glad I saved mine from the 70's) at the sweep tube ratings. They're junk. Many sweep tube rigs also generate a lot of RFI.

Most homebrew equipment is worth nothing. About the only homebrew device I would buy would be an antenna tuner - but only if I could see inside it first. Hopefully, it will have a roller inductor.

Used coax is a gamble. There's no telling how long it has weathered. Watch out for "RG-58" cable that says "30 Volts" on it. It's probably thin ethernet which doesn't even come close to being usable. It's probably OK if it is Belden RG-58 A/U type. The black insulation should be shiny.

Boat anchors like old test equipment and the like can be a real good buy if you can pick them up for about \$10 or less. The more knobs and switches the better. Sometimes the cabinets can be worth quite a bit, especially if you're a builder. There's usually about \$50 worth of good, high-quality parts inside these gems.

Don't hesitate to scrap what once was a precision piece of test gear - even if it's a name brand like HP or Tektronix. You'll get more for the parts at future hamfests than you paid for the whole unit. Also, your junk box will be well stocked afterwards.

Save all of the old vacuum tubes that you can get your hands on. An old HP frequency counter, for example, might have 100 tubes in it. There are virtually no tube manufacturers left and these old pulls will soon be in very high demand. I picked up a very good tube tester with charts for \$2. I have since found it to be indispensable.

I hope you've found the comments and observations of this hamfest "junkie" to be useful. See you at the next swap meet.

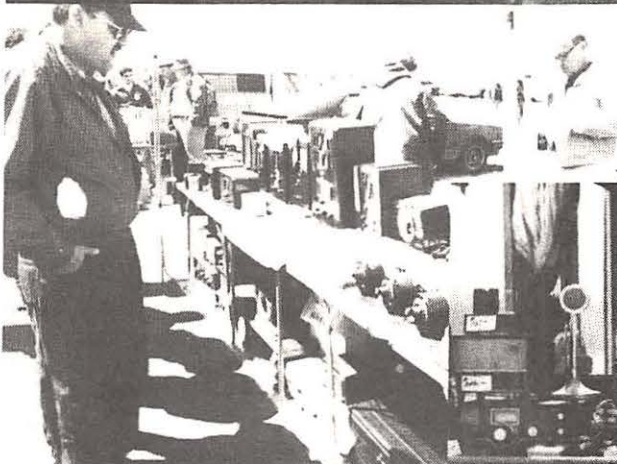


To find a hamfest or swapmeet in your area, consult the Monitoring Times Convention Calendar on page 100.

Bob Grove



Bob Grove



Mark Swarbrick

Bob Grove

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Our RELM two-way radio transceivers were especially created for government agencies. When you need to talk to police, fire, ambulance, or state, federal and international response forces, RELM transceivers may be quickly programmed for up to 48 frequencies. Listed below, are some of our most asked about transceivers. For additional assistance, call CEI at 313-996-8888.

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List price \$465.00/CE price \$319.95/SPECIAL
20 Channel • 5 Watt • Handheld Transceiver
Frequency range: 148-174 MHz. continuous coverage. Will also work 134-148 MHz. with reduced performance. The RELM RSP500B-A is our most popular programmable 5 watt, 20 channel handheld transceiver. You can scan 20 channels at up to 40 channels per second. It includes CTCSS tone and digital coded squelch. Snap on batteries give you plenty of power. Additional features such as time-out timer, busy-channel lockout, cloning, plug-in programming and IBM PC compatibility are standard. It is F.C.C. type accepted for data transmission and D.O.C. approved. We recommend also ordering the BC45 rapid charge 1 1/2 hour desk battery charger for \$99.95, a deluxe leather case LC45 for \$48.95 and an external speaker microphone with clip SM45 for \$59.95. Since this radio is programmed with an external programmer, be sure to also order one PM45 at \$74.95 for your radio system.

NEW! RELM® UC102/UC202

List price \$128.33/CE price \$79.95/SPECIAL
CEI understands that all agencies want excellent communications capability, but most departments are strapped for funds. To help, CEI now offers a special package deal on the RELM UC102 one watt transceiver. You get a UC102 handheld transceiver on 154.5700 MHz., flexible antenna, battery charger and battery pack for only \$79.95. If you want even more power, order the RELM UC202 two watt transceiver for \$114.95.

NEW! RELM® RH256NB-A

List price \$449.95/CE price \$299.95/SPECIAL
16 Channel • 25 Watt Transceiver • Priority Time-out timer • Off Hook Priority Channel
The RELM RH256NB is the updated version of the popular RELM RH256B sixteen-channel VHF land mobile transceiver. The radio technician maintaining your radio system can store up to 16 frequencies without an external programming tool. All radios come with CTCSS tone and scanning capabilities. This transceiver even has a priority function. Be sure to order one set of programming instructions, part # PI256N for \$10.00 and a service manual, part # SMRH256N for \$24.95 for the RH256NB. A 60 Watt VHF 150-162 MHz. version called the RH606B is available for \$429.95. A UHF 15 watt, 16 channel similar version of this radio called the LMU15B-A is also available and covers 450-482 MHz. for only \$339.95. An external programming unit SPM2 for \$49.95 is needed for programming the LMU15B UHF transceiver.

NEW! RELM® LMV2548B-A

List price \$423.33/CE price \$289.95/SPECIAL
48 Channel • 25 Watt Transceiver • Priority
RELM's new LMV2548B gives you up to 48 channels which can be organized into 4 separate scan areas for convenient grouping of channels and improved communications efficiency. With an external programmer, your radio technician can reprogram this radio in minutes with the PM100A programmer for \$99.95 without even opening the transceiver. A similar 16 channel, 60 watt unit called the RMV60B is available for \$489.95. A low band version called the RML60A for 30-43.000 MHz. or the RML60B for 37-50.000 MHz. is also available for \$489.95.

RELM® Programming Tools

If you are the dealer or radio technician maintaining your own radio system, you **must** order a programming tool to activate various transceivers. The PKKIT010 for \$149.95 is designed to program almost all RELM radios by interconnecting between a MS/DOS PC and the radio. The PM100A for \$99.95 is designed to externally program the RMV60B, RML60A, RML60B and LMV2548 radios. The SPM2 for \$49.95 is for the LMV25B and LMU15B transceivers. The RMP1 for \$49.95 is for the RMU45B transceiver. Programmers must be used with caution and only by qualified personnel because incorrect programming can cause severe interference and disruption to operating communications systems.

★★★ Uniden CB Radios ★★★

The Uniden line of Citizens Band Radio transceivers is designed to give you emergency communications at a reasonable price. Uniden CB radios are so reliable they have a two year limited warranty.

PRO310E-A3 Uniden 40 Ch. Portable/Mobile CB...\$72.95
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GRANT-A3 Uniden 40 channel SSB CB mobile...\$152.95
WASHINGTON-A Uniden 40 ch. SSB CB base...\$209.95
PC122-A3 Uniden 40 channel SSB CB mobile...\$113.95
PC66A-A Uniden 40 channel CB Mobile...\$78.95
PRO510XL-A3 Uniden 40 channel CB Mobile...\$34.95
PRO520XL-A3 Uniden 40 channel CB Mobile...\$49.95
PRO535E-A Uniden 40 channel CB Mobile...\$73.95
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RD25-A Uniden visor mount radar detector...\$54.95

Bearcat® 200XLT-A

List price \$509.95/CE price \$239.95/SPECIAL
12-Band, 200 Channel • 800 MHz. Handheld Search • Limit • Hold • Priority • Lockout
Frequency range: 29-54, 118-174, 406-512, 806-956 MHz. Excludes 823.9875-849.0125 and 868.9875-894.0125 MHz. The Bearcat 200XLT sets a new standard for handheld scanners in performance and dependability. This full featured unit has 200 programmable channels with 10 scanning banks and 12 band coverage. If you want a very similar model without the 800 MHz. band and 100 channels, order the BC 100XLT-A3 for only \$179.95. Includes antenna, carrying case with belt loop, ni-cad battery pack, AC adapter and earphone. Order your scanner now.

Bearcat® 800XLT-A

List price \$549.95/CE price \$239.95/SPECIAL
12-Band, 40 Channel • No-crystal scanner Priority control • Search/Scan • AC/DC Bands
29-54, 118-174, 406-512, 806-912 MHz. Now...nothing excluded in the 806-912 MHz. band. The Uniden 800XLT receives 40 channels in two banks. Scans 15 channels per second. Size 9 1/4" x 4 1/2" x 1 1/2". If you do not need the 800 MHz. band, a similar model called the BC 210XLT-A is available for \$178.95.

NEW! Uniden® MR8100-A

Call 313-996-8888 for special CEI pricing
12-Band, 100 Channel • Surveillance scanner
Bands: 29-54, 116-174, 406-512, 806-956 MHz. The Uniden MR8100 surveillance scanner is different from all other scanners. Originally designed for intelligence agencies, fire departments and public safety use, this scanner offers a breakthrough of new and enhanced features. Scan speed is almost 100 channels per second. You get four digit readout past the decimal point. Complete coverage of 800 MHz. band when programmed with a personal computer. Alphanumeric designation of channels, separate speaker, backlit LCD display and more. To activate the many unique features of the Uniden MR8100 a computer interface program is available for \$19.95. Due to manufacturers' territorial restrictions, the MR8100 is not available for direct shipment from CEI to CA, OR, WA, NV, ID or UT.

NEW! Ranger® RCI2950-A3

List price \$549.95/CE price \$259.95/SPECIAL
10 Meter Mobile Transceiver • Digital VFO Full Band Coverage • All-Mode Operation Backlit liquid crystal display • Repeater Splits RIT • 10 Programmable Memory Positions
Frequency Coverage: 28.0000 MHz. to 29.6999 MHz. The Ranger RCI2950 Mobile 10 Meter Transceiver has everything you need for amateur radio communications. The RF power control feature in the RCI2950 allows you to adjust the RF output power continuously from 1 watt through a full 25 watts output on USB, LSB and CW modes. You get a noise blanker, roger beep, PA mode, mike gain, digital VFO, built-in S/R/MOD/SWR meter. Frequency selections may be made from a switch on the microphone or the front panel. The RCI2950 gives you AM, FM, USB, LSB or CW operation. For technical info, call Ranger at 619-259-0287.



RELM
LMV2548B
Only \$289.95

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BC70XLT-A Bearcat 20 channel scanner...\$159.95
BC142XL-A Bearcat 10 ch. 10 band scanner...\$84.95
BC147XLT-A Bearcat 16 ch. 10 band scanner...\$94.95
BC172XL-A Bearcat 20 ch. 11 band scanner...\$134.95
BC177XLT-A Bearcat 16 ch. 11 band scanner...\$134.95
BC590XLT-A Bearcat 100 ch. 11 band scanner...\$194.95
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BC002-A CTCSS tone board for BC590/760XLT...\$54.95
BC003-A Switch assembly for BC590/760XLT...\$22.95
BC855XLT-A Bearcat 50 ch. 12 band scanner...\$199.95
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BC330A-A Bearcat Information scanner...\$99.95
BC560XLT-A Bearcat 16 ch. 10 band scanner...\$94.95
BP205-A Ni-Cad batt. pack for BC200/BC100XLT...\$39.95
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COSMOPOLIT-A Grundig shortwave receiver...\$199.95
SATELLIT500-A Grundig shortwave receiver...\$679.95
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ATS803A-A Sangean shortwave receiver...\$159.95
74102-A Midland emergency weather receiver...\$39.95
77116-A Midland CB with VHF weather & antenna...\$66.95
77118-A Midland CB mobile with VHF weather...\$62.95
77913-A Midland CB portable with VHF weather...\$79.95
76300-A Midland CB base station...\$92.95
FBE-A Frequency Directory for Eastern U.S.A...\$14.95
FBW-A Frequency Directory for Western U.S.A...\$14.95
RFD1-A MI, IL, IN, KY, OH, WI Frequency Directory...\$14.95
RFD2-A CT, ME, MA, NH, RI, VT Directory...\$14.95
RFD3-A DE, DC, MD, NJ, NY, PA, VA, WV Dir...\$14.95
RFD4-A AL, AR, FL, GA, LA, MS, NC, PR, SC, TN, VI...\$14.95
RFD5-A AK, ID, IA, MN, MT, NE, ND, OR, SD, WA, WY...\$14.95
RFD6-A CA, NV, UT, AZ, HI, GU Freq. Directory...\$14.95
RFD7-A CO, KS, MO, NM, OK, TX Freq. Directory...\$14.95
PWB-A Passport to World Band Radio...\$16.95
ASD-A Airplane Scanner Directory...\$14.95
TSG-G7 "Top Secret" Registry of U.S. Govt. Freq...\$16.95
TTC-A Tune in on telephone calls...\$14.95
CBH-A Big CB Handbook/AM/FM/Freeband...\$14.95
TIC-A Techniques for Intercepting Communications...\$14.95
RRF-A Railroad frequency directory...\$14.95
EEC-A Embassy & Espionage Communications...\$14.95
SMH-A2 Scanner Modification Handbook, Vol. 2...\$18.95
LIN-A Latest Intelligence by James E. Tunnell...\$16.95
A80-A Magnet mount mobile scanner antenna...\$34.95
A70-A Base station scanner antenna...\$34.95
USAMM-A Mag mount VHF ant. w/ 12' cable...\$39.95
USAK-A 3/4" hole mount VHF ant. w/ 17' cable...\$34.95
Add \$4.00 shipping for all accessories ordered at the same time.
Add \$15.00 shipping per radio and \$4.00 per antenna.

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Radio Cook Islands: Greetings from a South Pacific Paradise

by Edward J. Pyatt

The Cooks lie between Tahiti and Tonga in the south Pacific. The largest island, Rarotonga, is only 22 miles in circumference. It can fit comfortably into Wellington Harbor in New Zealand.

The population of the 15 islands which make up the group is only 18,000. There are 22,000 Cook Islanders who live in New Zealand, most in the Auckland area. For many years the Cook Islands, which are named for the British navigator Captain James Cook, were administered by New Zealand. Today the Cook Islands are self-governing.

The Rhythm of Rarotonga

Cook Islanders are very friendly people. When you pass them on the roads and streets, you can reasonably expect to hear a "hello" or "hi" or a greeting of "kia orana." They use kia orana very much the way the Hawaiians use "aloha." It means hello, welcome, goodbye, etc. The Cook Islanders are Polynesians -- Maori Polynesians with a native language very similar to that of the Polynesian Maoris of New Zealand. Virtually everyone speaks English as well.

The main city of the Cooks is Avarua, pronounced Av-ah-ru-a. It's small. The main shopping area has only a handful of stores and a couple of banks. However it is perfectly adequate for the island's needs. Life on Rarotonga, the major island of the Cook Islands group, has ambience. It is relaxed, unharried, and personal. People take time to talk.

During my visit I saw a man tending some plants in a watery, low-lying field. I asked him what the plants were. He told me they were taro plants. He went on to introduce himself as Roy and to explain the cultivation and harvesting of the taros to me. He was a Maori farmer and had spent 20 of the last 30 years in New Zealand farming and working in a factory. He moved back to Rarotonga 10 years ago.

We spent over an hour sitting under a coconut tree and talking about ourselves, the world, and life in general. Our meeting ended with Roy extending an invitation to me to drop by his home for tea. Such is life on Rarotonga or Raro as the locals sometimes refer to it.

The Radio Station

The atmosphere at Radio Cook Islands has a similar kind of island charm and informality. I visited the Radio Cook Islands studio one morning just after they had completed their early morning programs. The studio is located in a residential area of Avarua off the main road behind a small shopping arcade. Just opened in December of 1989, the structure is adorned with orange and red stripes on a white background with the words "Cook Islands Broadcasting" emblazoned on it.

The studio equipment is also new. A satellite dish and a small antenna sit behind the small building. Given the present scale of operations, the small but functional broadcasting house services both the radio and newly initiated television stations quite adequately.

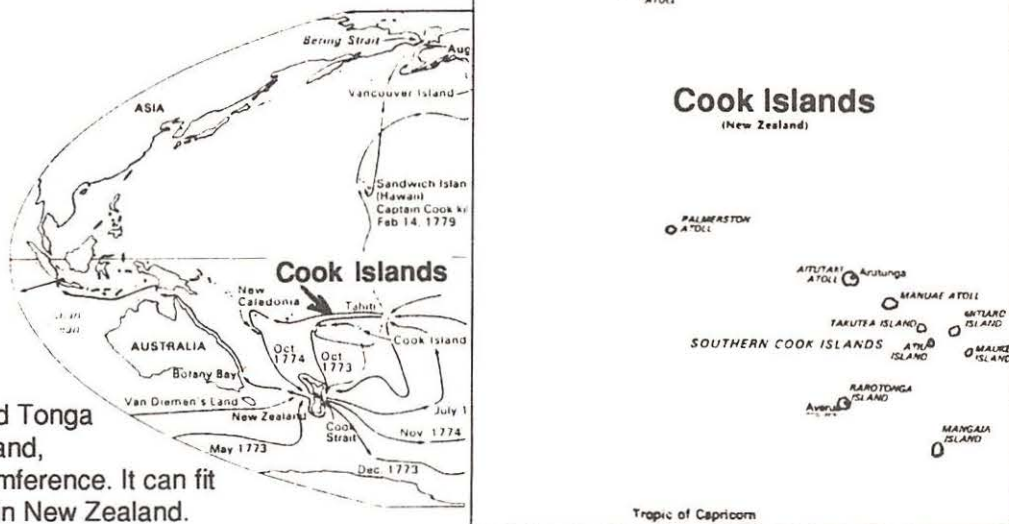
Although they share the same building, the radio and television staffs are not interchangeable. The radio staff, two full-time and seven part-time announcers, do not go over to do the

television broadcasts. The television broadcasts are of short duration lasting six hours per day with 10 hours on Sundays. About 75 percent of the programs seen are imports from New Zealand, Australia, Britain and the U.S.A.

Programming that Reflects the Culture

During my visit to the Radio Cook Islands studio I was provided with an overview of the station's operations by Mrs. Ngamarama Syme, one of the station's announcers and a 10 year veteran of the station. She clarified that the major purpose of the Radio Cook Islands broadcasts is to inform the people of the Cooks about local, regional, and world events and to provide a form of entertainment. The station does not seek to reach people outside of the Cooks.

Consequently, Radio Cook Islands broadcasts consist of local news, regional news, and world news. The regional news is derived from PAC Broad, a news service organization of Pacific Island nations. World news is provided by relays of the shortwave news broadcasts of Radio New Zealand International and Radio Australia.



The station also broadcasts sports including football, cricket, rugby, tennis, and netball. Music makes up about 55 percent of broadcast time. There is a mixture of Polynesian music and western style pop, rock, and easy listening tunes. Request programs are very popular.

The programming of the station reflects a good deal of the local culture. The station announcers use the Maori and English languages interchangeably during the broadcasts. There is also an evening broadcast of local news completely in Maori. But otherwise an announcer may be speaking in English one minute and switch to Maori the next minute. Listening to such an arrangement seems perfectly natural. It is a reflection of how the Cook Islanders use the languages in their everyday life.

The Early Days of Radio in the Cooks

Radio broadcasts in the Cook Islands started in the mid 1950s. The principal person involved in the establishment of island based broadcasting was Percy Henderson. He initiated radio broadcasts with little more than a room, a low-powered transmitter, and a single tape recorder. Henderson was assisted by Stuart King. The broadcast station was government funded as part of the government's Social Development Department.

The service was short and irregular in the early days. On some days the station would air from 9 a.m. to noon and on others from 6 p.m. to 9 p.m. Many of the old reels of the early programs still exist. Even so, no one has written a book or even a pamphlet documenting the history of broadcasting in the Cook Islands.

Service on the Shortwave Band

Radio Cook Islands broadcasts from 6 a.m. to midnight local time (1600 to 1000 UTC) on 11760 kHz in the 25 meter shortwave band. The major reason for the station using the shortwave band is to be sure the signals, which are transmitted from the main island of Rarotonga, will reach the outer islands.

The musical request programs are particularly popular in the outer islands. People telephone or write in to request a musical selection for a friend or family member. It could be to mark a birthday or anniversary or just for a special friend. The Friday night "Party Time" program is an island favorite.

The staff members at Radio Cook Islands are well aware they have listeners in other countries. They have received letters and reception reports from Alaska, Canada, the U.S. and England. The staff said that the reception reports from abroad

do have some practical value for their station, and the station normally verifies reports with a QSL card. However, the former head of the station's technical service and usual verification signer, Mr. N.E. Tangaroa, has moved to New Zealand. No other staff member had taken over the responsibility of responding to reception reports at the time of my visit.

Radio Cook Islands transmits with five kilowatts of power on both the shortwave and medium wave bands. They utilize a Nautil Amphet transmitter which was purchased from New Zealand. The transmitter is located in the community of Matavera on Rarotonga's northeast coast and stands 305 meters tall. A standby transmitter is located in Black Rock on the northwest side of the island.

Recent Developments and Future Plans

The transmitter used by Radio Cook Islands is new. The old transmitter was found to be rusted through. Fortunately this rusty condition was discovered before the tower fell, since the transmitter is located right next to a school. A New Zealand army detachment which happened to be on maneuvers on Rarotonga at the time assisted in assembling and erecting the new

transmitter when it arrived. Such is life in paradise.

As far as programming is concerned the station has no plans to change much. Station personnel claim that it is not likely Radio Cook Islands will, at any point in the future, have a desire to inform the world about life, culture, and the economic interests of the Cook Islands and other Pacific island nations. The station insists that Radio Australia and Radio New Zealand International already do a good job providing the wider world with news of the Pacific. However, there is some possibility that Radio Cook Islands will utilize more frequencies in the shortwave bands for at least some of its broadcasts. FM broadcasts are not likely.

Some thought has been given to changing the program format from a mixed news, music, cultural events type to a top 10 music format. The majority view is that such a top 10 format really would not serve the best interests of the Cook Islands population, particularly in the outer islands where radio is still the main source of information about the outside world.

Radio Cook Islands is government funded but the station also accepts commercial ads. The government hopes that both radio and television will become self-supporting in the not too distant future, one possible explanation of the proposed format change.

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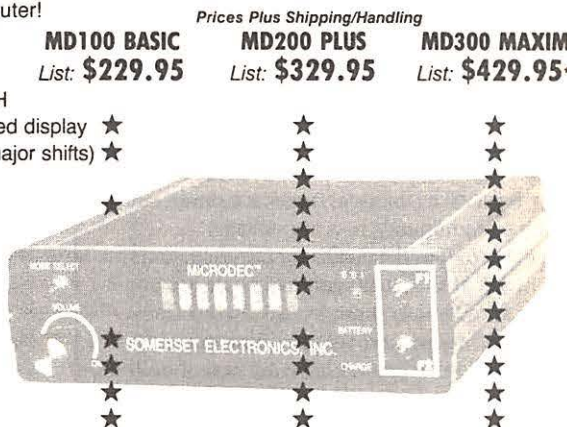
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The Best of Both Worlds


Being on Rarotonga provides one with a keen reminder of the basic purpose of radio communication -- to let people hear from and about one another and to provide a voice for shared concerns and experiences. A visitor is immediately struck by the smallness of the island and by its relative isolation. It seems a small, but contented, community in a big ocean.

Radio provides the means for bringing home the reality that the island and its people are not alone or forgotten or unimportant. Radio Cook Islands does a superb job at providing this linkage. Hence Cook Islanders have the best of both worlds. They are removed but in touch.

In many ways being far away is preferable to the mindless pursuit of "more, bigger, and better." The outside world can seem pretty mad at times here in the Cooks. The local people jokingly refer to the world news broadcasts relayed from Radio Australia and Radio New Zealand International as "the usual disasters."

From their perspective, this is an accurate appraisal as one day flows gently into another here on this south Pacific paradise. Every day seems much the same with the sun, the sea, swaying coconut trees, and white clouds floating across a blue sky. Life is gentle. You know people and they know you.

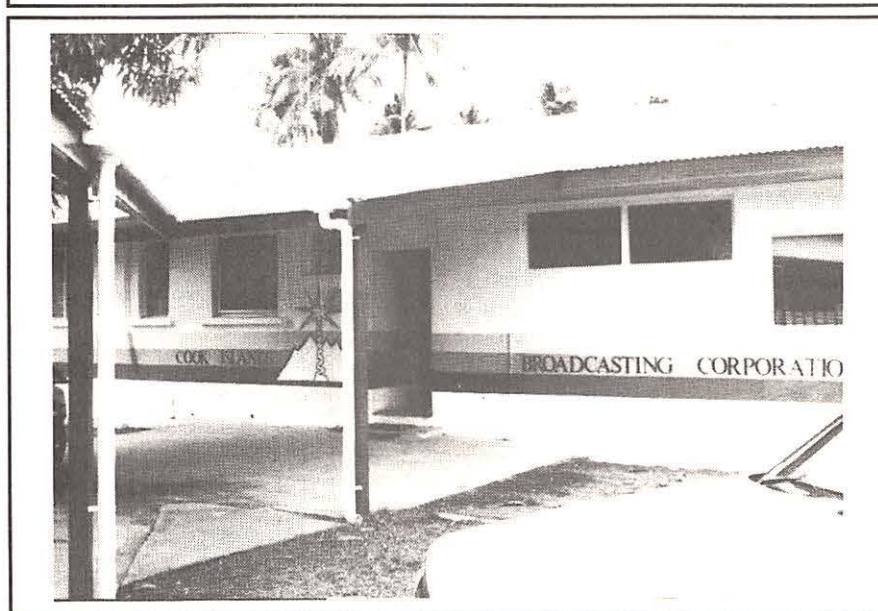
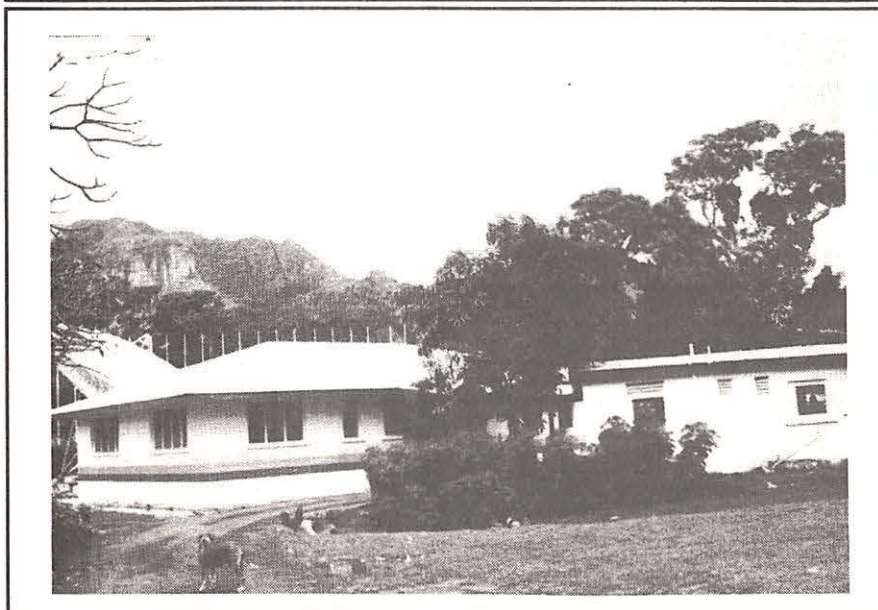
There is little crime and outsiders almost always wonder why this is the case on small islands like this. It is really perfectly reasonable. After all, where would a bank robber run on such a small island after he has committed his crime? There is no place to hide.

So if things get a little up tight, people in the Cook Islands find no need to go off the deep end. They unwind, go fishing, or sit under a coconut tree and contemplate life for a while. Life may have its problems but here on Rarotonga it is likely that the sun will shine tomorrow, that the sky will be clear, and that a gentle breeze will blow in from the ocean. So just smile at people and on this island paradise you can be assured that everyone will smile back. 

Top - Ngaire Kavana (seated) and Ngamarama Syme, two of Radio Cook Island's announcers;

Center - Broadcast House, Rarotonga, Cook Islands;

Bottom - Radio Cook Island Studio Building





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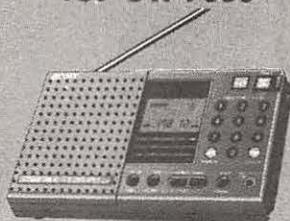


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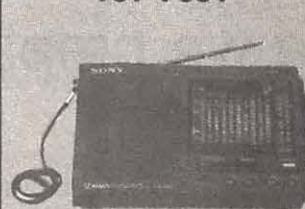


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Communications Eavesdropping in the Battlefield

Are we prepared?

by Jack Sullivan

Operation Desert Storm was a complete military success -- or was it nearly a disaster? The air war had been brilliantly planned and executed. The ground war had quickly smashed the much-vaunted Iraqi defensive positions and captured 30 percent of Iraq in 100 hours, with unexpectedly light casualties. At least this was the popular image conveyed by Dan Rather and Tom Brokaw on the nightly news broadcasts.

This was the same simplistic view of the Gulf War that I had in mind as I settled back one recent evening and opened the March 18 issue of *Aviation Week* magazine.

The headline article jumped out at me with its title: "U.S. Searches for Electronic Equipment Used by Iraqis to Foil Allied Attacks."

Yes, incredible as it might seem, the enemy had been listening in on tactical military air and ground communications during Desert Storm and deriving a military advantage from the intelligence they had uncovered.

Mobile SCUD missile launchers had been made more difficult targets because the Iraqis often knew when Coalition aircraft were on their way to bomb them. Ambushes were laid for unsuspecting low-flying attack aircraft after their combat tactics were overheard as they were discussed in plane-to-plane chatter. In many cases, targeting codes were broken and many of our Air Force's plans were known in advance to the enemy. Obviously, lives had been lost as a result of this gap in our security.

This was a sobering revelation for anyone used to seeing demonstrations of America's technological military dominance nightly on the cable news television channel. It was also surprising and unwelcome news for monitoring enthusiasts like myself who are familiar with most of the inner complexities of U.S. military communications.

With our high-tech systems and months of planning, was it possible that our vital tactical communications had been so grossly compromised? Indeed, how close had this situation put us to a military disaster rather than a military triumph?



Desert Storm communications above 30 MHz were heard almost worldwide from these manpack radios, due to skip conditions. Disturbingly, much of it was in the clear.

Courtesy ITT Aerospace

The Winning Word

Tactical communications are the nervous system of any military organization. It is the vital control network through which critical orders and intelligence about the enemy and the battlefield are transmitted and received back and forth between the commanders in the rear and the front line combat elements.

This communications network must function reliably and securely at all times and under all possible conditions. If the communications are not secure against enemy prying, then it's as if your plans were broadcast to them over loudspeakers at the front. Incredible amounts of sensitive information can be extracted from even the most routine tactical communications links in a military organization, giving an enemy force the ability to come up with a detailed picture of the forces arrayed against it. Additionally, vital communications links can be interfered with or rendered useless at critical times, giving the enemy an important advantage.

Looking at the vast geography of the Gulf War battlefield and the many thousands of individual soldiers, vehicles and aircraft involved, it is obvious that secure communications was a critical necessity of first importance. Many lives were in the balance. So what happened that allowed our sensitive communications to be intercepted by the enemy in the Gulf?

The Communications Battleground

One way to better understand the mechanics and implications of tactical military communications and their interception is to take a look at their evolution. The first military use or misuse of electronic communications came during the Civil War, when Confederate cavalry raiders seriously interrupted the Union's landline telegraph system, intercepting orders, sending false orders and finally destroying the lines themselves and stealing the wire.

The earliest use of intercepted radio signals for their intelligence value came during World War I. Extensive use of radio intercepts occurred during World War II. The Allies were able to decipher HF communications between German units and their commanders and HF direction finding equipment helped locate enemy submarines and surface ships.

As the war progressed and Allied bombers were able to fly over enemy-occupied Europe, steps were taken to equip these aircraft with VHF receivers and recorders to capture German ground-to-air communications for further analysis after the aircraft returned. The primary interest was to figure out the Germans' organizational setup (their order of battle) as well as how to jam these transmissions in order to deprive the Germans of the ability to control their fighter aircraft.

Later in the war, so much valuable information was being derived from these

intercepted communications that jamming was reserved for only exceptional missions. The German fighter pilots would talk among themselves in the clear!

Since the enemy was also listening to Allied VHF aircraft communications, special aircraft were used to fly near the European coast and jam our bombers' own channels in order to deprive the Germans of advanced warning of bomber fleets assembling over England prior to strikes deep into occupied Europe. Extensive use of airborne jammers was also made to disrupt German tank communications in the VHF low band, especially during the Battle of the Bulge.

After the end of the war in Europe, special ELINT (electronics intelligence) "Ferret" aircraft operating in the Pacific were equipped with receiving equipment for monitoring and recording Japanese communications in the band 550 kHz-143 MHz.

Eavesdropping on enemy tactical communications went into decline after World War II. With the coming of the Cold War and the switch of Soviet fighter controllers from HF to VHF, the U.S. COMINT (communications intelligence) effort was forced into an active role of sending specially equipped Ferret aircraft to fly around the borders of the Soviet Union.

The Soviets would switch on search radars, whose characteristics could then be measured, and scramble interceptor jets, whose short-range VHF communications could be monitored as well. A significant number of Ferrets and their pilots were shot down during the 1950s -- a reflection of the importance of information relating to tactical military communications to both sides involved.

Interception of tactical military communications moved to the next stage with the inclusion of a sophisticated automatic radio signal collection system on board the famous U-2 spy planes which overflew the USSR in the late 1950s. Several sensitive wideband receivers would continuously search the entire VHF/UHF spectrum, stopping to record the frequency and content of radio signals.

In Vietnam, the U.S. Army was well prepared with a variety of fixed, mobile, and portable intercept receivers for the principal communications bands in use. The Viet Cong/North Vietnamese also made effective use of captured American communications sets to eavesdrop on U.S. tactical communications. They paid particular attention to monitoring 243.0 MHz, the military emergency frequency used by the portable search-and-rescue transceivers carried by downed American airmen.

The tremendous importance of knowing the nature and disposition of the tactical communications of enemies or potential enemies is shown by the high level of effort and cost continuing to be expended by the United States

to maintain communications-gathering satellites in earth orbit. Beginning in the early 1970s, the U.S. has maintained an almost constant presence in space with spy satellites that continuously relay high-resolution ground imagery and received VHF/UHF radio communications to U.S. intelligence analysts.

The cost of developing, launching and maintaining these satellite systems is huge, yet at almost any time at least two satellites are in orbit. During a critical period such as the Gulf crisis, additional surveillance satellites are launched to provide U.S. military planners with an in-depth picture of the military situation.

Military Radio Equipment

The vulnerable links in the chain of communication become more evident with an overview of the types of military communications equipment and how they are used. The principal frequency bands used by the U.S. forces for tactical communications in Desert Storm are as follows:

2.0000-30.0000 MHz (single sideband and data)

Tactical communications with armor and infantry units beyond the normal range of VHF communications (5-50 miles).



The SINCGARS radios, while offering a solution to the secure communications problem, had only limited availability during Desert Storm.

Courtesy ITT Aerospace

30.000-87.975 MHz (wideband FM)

Tactical communications between infantry, armor, forward command posts, as well as air-to-ground liaison with ground attack aircraft like the A-10 Thunderbolt II (Warthog). Used also by ships (Navy and Coast Guard). Range 5-50 miles between units. This was the principal tactical band used by combat elements in Desert Storm.

Everyone is familiar with the "grunt" in desert camouflage carrying the bulky manpack radio with its characteristic 10 foot long whip antenna. Interestingly, this band is prone to experience "skip" during certain periods and it is probable that Desert Storm communications above 30 MHz were heard in the U.S. In fact, there was a tremendous increase in low-band skip military traffic during operations Desert Shield and Desert Storm, all of which was apparently "in the clear."

While it is not possible to determine which communications came from the Persian Gulf, the radio techniques heard were probably typical of those used during the Gulf war. Channels with conspicuous activity during this time were 36.10, 38.30, 38.80, 38.90 and 40.40 MHz. Though using the wideband military system, these communications could be easily picked up on a conventional scanner.

138.0000-174.0000 MHz (AM and some wideband FM)

Tactical communications of all kinds, including data links and point-to-point communications links. Range 5-50 miles.

225.000-399.975 MHz (AM and some wideband FM)

Tactical aircraft communications (plane-to-plane, plane-to-command post, plane-to-AWACS, air traffic control, in-flight refuelings and ship-to-aircraft) as well as ship-to-ship and wideband point-to-point data links. Range usually 50 miles or less, though high flying aircraft can be overheard 200-300 miles away.

After the extensive military buildup during the Reagan years, U.S. military forces entering the Gulf War were superbly equipped with the most modern and effective equipment available, including the latest generation of advanced communication gear. All field radio equipment was at least capable of operating in a secure voice, or scrambled, mode.

Ground units were at least partially equipped with the new SINCGARS (Single Channel Ground and Airborne Radio System) radios. Operating in the 30-88 MHz band, these 2320-channel radios can function either as single frequency communicators or in a frequency hopping mode designed to provide security from interception as well as relative immunity from jamming.

In this system, all radios in the same "net" are initially synchronized, after which the radios simultaneously hop from one pseudorandomly-selected channel to another in unison. At a hop rate of about 150 channel changes per second, a conventional receiver trying to listen in would not be able to monitor these communications.

SINGARS radio equipment is available in a basic manpack transceiver (the AN/PRC-119) and in various fixed and vehicular configurations. Some aircraft would also have SINGARS-compatible radios for air-to-ground liaison communications.

It is doubtful that every combat unit in the Gulf War was equipped with SINGARS. The design engineering for this system was only finalized in the late 1980s and full-scale production is scheduled for the coming years.

It is probable that most combat units in the Gulf War were equipped with the standard 1960s-vintage AN/PRC-77 manpack transceivers and AN/VRC-12 vehicular radios. While capable of "secure voice," these are conventional one-channel-at-a-time transceivers whose transmissions can be received with a standard scanner. They are expected to remain the "workhorses" of the U.S. Army well into the next century.

Aircraft communications in the Gulf War probably took place predominantly in the 225-

400 MHz UHF military aero band. Most aircraft in the Gulf were equipped with state-of-the-art transceivers such as the AN/ARC-164. Utilizing a system code named HAVE QUICK, these radios can operate either in a conventional single-frequency mode or in a frequency-hopping mode similar in concept to that used by SINGARS. In the conventional mode, transmissions can be picked up with a standard receiver. In the HAVE QUICK mode, only random short bursts of speech can be picked up on any of 7,000 possible channels.

Given the probable state of deployment of these various radio systems in the Gulf War, communications security should have been possible to achieve. We should have had almost complete communications security, but we didn't. General Schwarzkopf has made the statement that our communications were "covered" during the Gulf War, which would imply that high level command and control communications were indeed passed by secure means. But what happened to compromise some of our military positions to Iraqi monitoring stations?

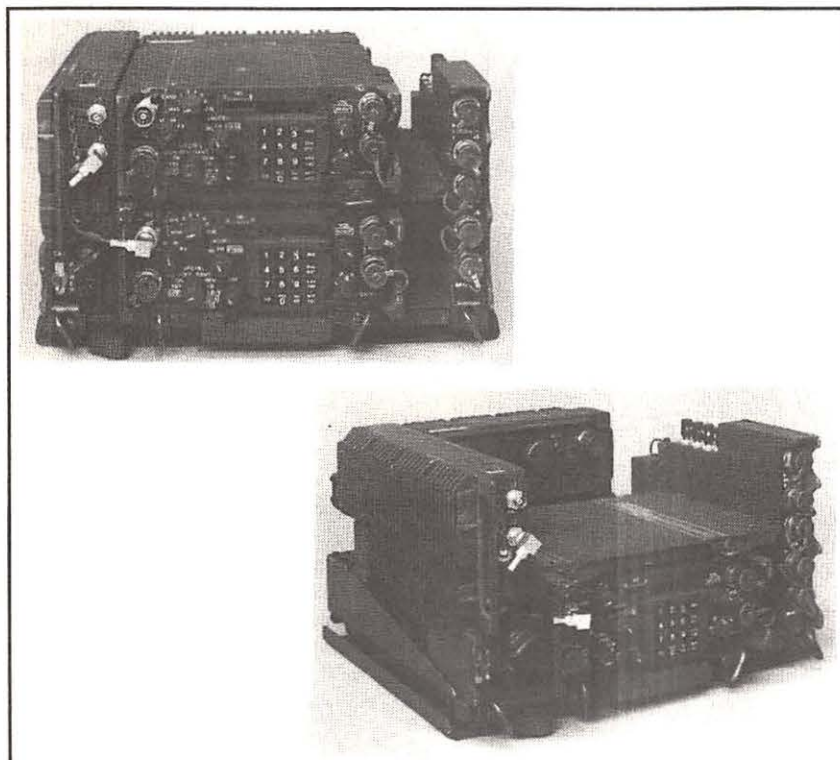
The military clearly defines the requirements for communications security. To begin with, radio communications are supposed to be kept to an absolute minimum. All communications, from the most common and mundane to the most secret and sensitive, are only supposed to be

passed using the appropriate communications mode, beginning with transmissions in the clear and progressing in levels of security up to fully scrambled. For instance, a call for replacement flashlight batteries might go out in the clear but a call for an entire unit to move so many kilometers in a certain direction should go out via a very secure communications system.

Frequencies and call signs are supposed to be changed frequently in order to make it more difficult for the enemy to gain a clear view of the forces opposing him. Effective use is supposed to be made of the intercept-resistant communications systems described above.

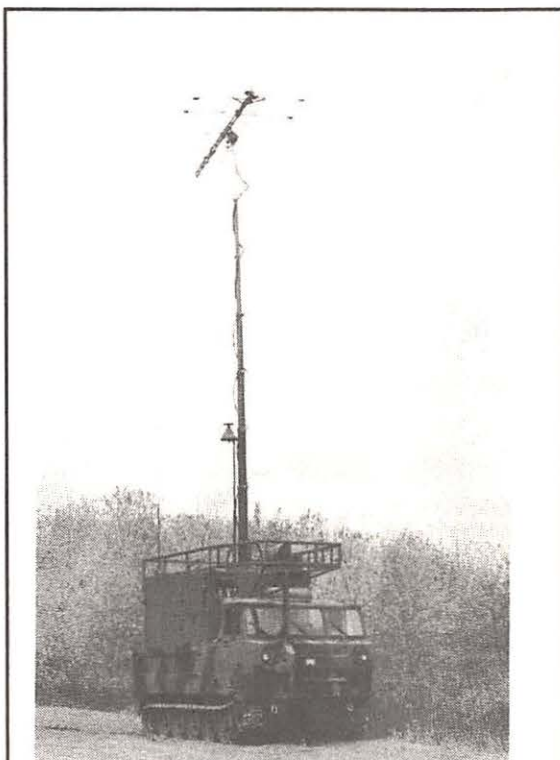
The Iraqis used a combination of Soviet intercept/direction finding equipment operating between 3 and 450 MHz. This equipment probably has all of the search capabilities found in commercially available scanning receivers like the ICOM R-7000 and AOR AR2500, both of which were used extensively by the Coalition forces in the Gulf. The *Aviation Week* article mentioned that the U.S. was actively searching the desert in southern Iraq and Kuwait for this equipment.

The fact that some of our communications were intercepted is proof that the guidelines for communications security were not and probably could not always be followed. The *Aviation Week* article made the startling admission that



The AN/VR series is expected to remain the "workhorse" of the Army for decades yet. Top photo of AN/VR-89 for short and long range vehicular use; Bottom photo of AN/VR-90 for long range use.

Courtesy ITT Aerospace



This mobile communications post resembles the Soviet-made equipment likely used by the Iraqis to eavesdrop on Allied comms.

Courtesy AEL Defense Corp.

Glossary of Terms Used

AWACS -- Airborne Warning and Control System. This acronym is applied to E-3 Sentry radar and communications aircraft used extensively in the Gulf War. Each aircraft can observe thousands of square miles of airspace and control many aircraft and other forces.

COMINT -- Communications intelligence. This term describes the overall process of gathering, processing and analyzing unfriendly communications traffic.

Ferret -- Aircraft used in feint operations that trick unfriendly forces into turning on radar systems and using tactical communications networks for directing interceptors or alerting missile batteries.

HAVE QUICK -- A family of secure-voice, anti-jamming radio systems for aircraft transceivers that employ a synchronized frequency-hopping scheme.

SCUD-NATO code name for a family of Soviet Surface-to-surface missiles that have been exported in considerable numbers to countries such as Iraq.

SIGINT -- Signals intelligence. This term describes the basic process of collecting intelligence from electronic signals in general, including communications, radar and telemetry.

SINGARS -- Military acronym for the single channel ground and airborne radio system

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our Saudi allies, who have no military tradition, would excitedly gossip about the war situation on clear tactical radio channels. The many foreign countries involved in the Coalition effort did not make the challenge of communications security any easier to achieve.

Life in the military can be described as long periods of boredom and inactivity punctuated by periods of sheer terror. Communications are often taken for granted and viewed mainly as a necessary evil whose importance is not fully understood by many of the people using the equipment.

Few soldiers or airmen truly accept the fact that anyone can and does listen to their communications. In the heat and confusion of battle, mistakes were made. It is easy to overlook some of the fine points of communications security doctrine when staying alive or worrying about the future take top priority.

Frequencies were left in use too long, as were tactical call signs. Sensitive information was transmitted in the clear. Air Force pilots racing across a trackless desert would switch to some random channel for interplane communications, ignoring the few extra steps and seconds required to enable their HAVE QUICK systems.

Communications discipline in the military is very lax during peacetime, as any monitoring enthusiast knows who has listened to military training exercises in the U.S. Under war time conditions, the Iraqis were ready to take advantage of this critical shortcoming in our military posture.

After looking at the facts in an event that could have ended tragically, the only conclusion that can be reached, is that our military personnel

require greater training in all aspects of communications theory, operations and security management. This requirement should be applied across the board, from the newest infantryman to the oldest fighter wing commander.

We may have the most powerful and sophisticated communications technology in the world, but without the ability to operate it effectively, we run the chance that the next military conflict may not end with so positive a result.



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Things That Go Beep in the Night

A PRIMER ON NONDIRECTIONAL BEACONS

Need a change of pace? From about 500 kHz on down, you'll find a myriad of interesting signals -- the "longwaves," as they are collectively known -- which offer a wealth of challenges for newcomers and veterans alike.

One occupant you can't miss is the Nondirectional Beacon (NDB). These stations act as high tech lighthouses for aircraft as well as ships at sea.

Following are some tips on hearing beacons and a nontechnical look at some of the hardware behind the signals. We'll even give you a sneak peek at a new generation of beacons in the planning.

Story and photos by Kevin Carey

Part of what keeps the mystique of radio monitoring is our tendency to imagine the setting and activities going on at the transmitting site. Most of the time this means picturing aircraft in an action-packed dogfight drill, a police chase across town or experiencing a foreign culture from some faraway land.

There is more happening in the spectrum, however. If you're ready for something different, you can find a new type of adventure in radio's "basement band." Here, relatively low-powered

nondirectional beacons operate day and night for the benefit of pilots and marine navigators equipped with direction finding (DF) receivers. They can use the DF bearings from their crafts to "home" in on NDB signals in order to stay on course and plot their own position in relation to the transmitter. (See Figure 1.)

The exact locations of aviation NDBs are shown on special maps called Sectional Charts. A separate chart is published for each region of the country.

Because of their stable signals and 24-hour operations, NDBs make perfect DX targets for those wishing to tune "down under" and explore the lower reaches of the radio spectrum. Since most NDBs are designed for a range of something less than 100 miles, it is exciting to pull in signals 10 times that distance using just a simple receiver. You will find such ranges quite possible during good band conditions.

Hunting beacon signals can become very addictive. After listening for a while and getting to know the "regulars" in your area, you may find, as others have, that individual NDBs can begin to take on a personal character -- their names being represented by their call sign IDs. Like a trusted friend, their faithful beeping sounds are sent forth day and night, through calm and storm, for all who need navigating assistance.

Chances are, if you live near an airport or a large body of water, you'll be able to hear one or more NDBs operating in your area. These unmanned navigation aids (NAVAIDS) are easily recognized by their repetitive two or three element Morse code (CW) IDs. No knowledge of the code is necessary, since most NDBs are programmed to send at a leisurely three to 10 words per minute. This makes it easy to jot down the dots and dashes as you hear them and look up the characters on a Morse chart (Table 1).

The beacon call sign often gives a good clue as to its location: for example, RO for Rochester,

ALP for Alpine, SSN for Seneca, etc. Some beacons also have a tape recorded AM voice signal riding "piggyback" with the CW ID to convey weather info, runway conditions and other pertinent information to navigators. Broadcast audio is typically sent to the NDB site via a telephone link from a central point such as an airport control tower.

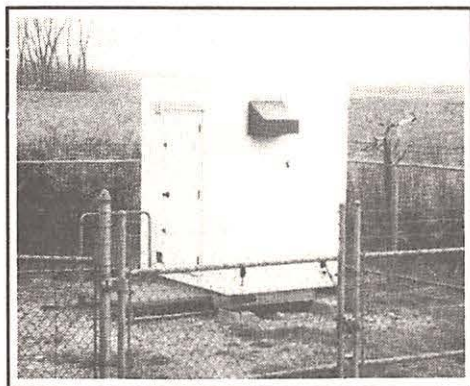
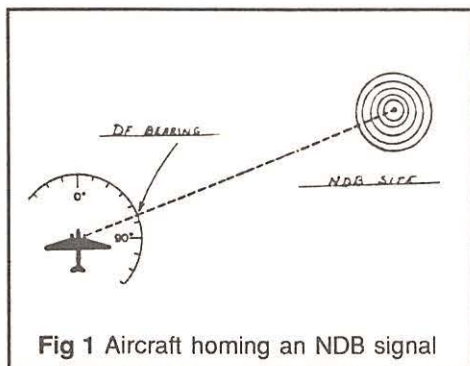
Although the majority of NDB activity is found between 190 and 435 kHz (AM mode) a few beacons may be heard as high as 530 kHz -- just below the AM broadcast band. When hunting for beacons, it's also wise to listen at different times of the day, because a station that is unreadable at noon local time may come booming through at 11 p.m. Station ZBB, Bimini, Bahamas, on 396 kHz is a good example of this. Its signal is clearly audible most evenings on the east coast but becomes unreadable after sunrise.

Even with the signal strength changes between night and day, longwave signals tend to be more stable overall than their shortwave counterparts. This is due in part to the predominant ground-wave propagation that prevails there.

In general, clear, cool nights seem to provide the best reception. At these times, static is at a minimum and propagation is often enhanced. You might hear stations over 1,000 miles away under such conditions.

To get you started on this band, Table 2 lists some selected FAA beacons operating in the United States. This is just a small sample of the beacons that are out there, so you will need to fire up your receiver to see what's active in your area.

The beacon chaser's game stays interesting due to its changeable nature. It's common for NDB frequencies or modes to change unexpectedly or for an entirely new call sign to show up on a previously quiet frequency.



You can find NDBs in some seemingly strange locations. Above, station AVN in Avon, NY, on 344 kHz.

Table 1

A	N
B	O
C	P
D	Q
E	R
F	S
G	T
H	U
I	V
J	W
K	X
L	Y
M	Z
1	6
2	7
3	8
4	9
5	0

Longwave Pubs

Finding current information on longwave has always been a challenge but that's changing these days. There are now several publications dealing with the subject and even a monthly newsletter.

To see what others are hearing, check the pages of *MT*. The "Utility World" column is a good place to look. Back issues of *MT* contain a wealth of longwave info under the "Below 500 kHz" column, written by *MT*'s longwave authority, Joe Woodlock, until his untimely passing last year. "Below 500 kHz" has now returned as a regular column, so watch for it each month.

"The Lowdown," the monthly journal of the Longwave Club of America (LWCA), is also an excellent source for frequency listings, reception tips and information on the license-free 1750 meter band, but more on this later. You can write the LWCA at 45 Wildflower Road, Levittown, Pa. 19057.

Ken Stryker, "Unidentified Beacons" editor for "The Lowdown" produces the "Aero/Marine Beacon Guide," a well-respected, comprehensive listing of North American beacons. It also contains tips on reception, QSLing and many other longwave topics. You can order this informative guide by sending \$15 to Ken Stryker, 2856-G W. Touhy Avenue, Chicago, Illinois 60645.

Table 2

Frequency	Beacon Call Sign	Location
344	AVN	Avon, NY
194	TUK	Nantucket, MA
326	CI	Cedar Rapids, IA
375	ELM	Elmira, NY
379	GKQ	Newark, NJ
332	HK	Chicago, IL
362	AK	Akron, OH
344	CL	Cleveland, OH
223	DM	Detroit, MI
359	BO	Boise, ID
407	CO	Colorado Springs, CO
353	CY	Cheyenne, WY
411	RD	Redmond, OR
263	DA	Daytona Beach, FL
329	CH	Charleston, SC
206	GLS	Galveston, TX
385	HO	Hot Springs, AR
338	RYN	Tucson, AZ
379	SF	San Francisco, CA
327	VYI	Kahului, HI
230	FA	Fairbanks, AK

An additional good source, though not really intended for hobbyists, is the "Airman's Guide," an FAA publication listing beacon facilities and other NAVAIDS. The guide makes interesting reading -- even for landlubbers. For price and availability information, write the U.S. Government Printing Office.

Profile of a Typical Station

The majority of NDB signals heard on longwave originate at lonely-looking, white shelters sitting in the middle of a clearing. Some, however, are in seemingly strange locations. I know of one that's located just behind a civil war cemetery and still another less than 50 feet from a major expressway.

NDB shelters vary widely in architecture depending on their age. Older shelters were made of traditional wood frame construction resembling a miniature house. There are still many of these in service. The current trend, however, is to use modern prefabricated enclosures like the one shown in Figure 2. They are cheaper, and make for fast installation since there's no need for field assembly. They can be delivered to the site by flat bed truck and are quickly set into position.

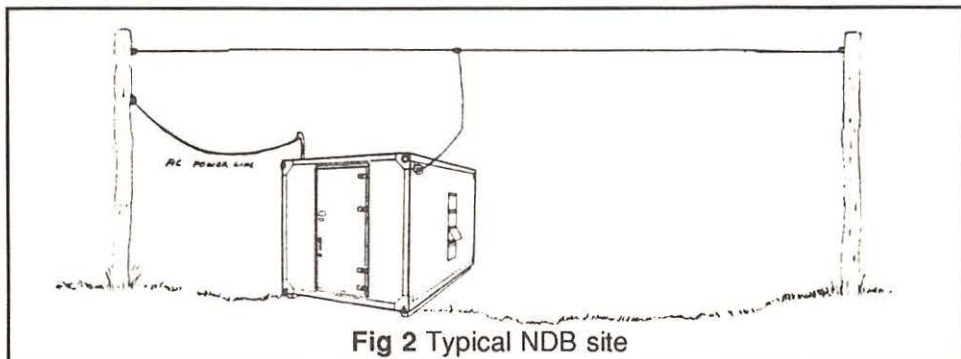


Fig 2 Typical NDB site

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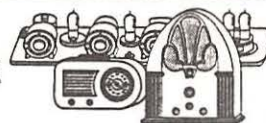
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Depending on the climate of the region and the other types of equipment being used in the building, some shelters use heating or air conditioning units to keep the equipment inside thermally comfortable. "Jane's Airport Equipment Catalog" (of "Jane's Fighting Ships" fame) shows several manufacturers of beacon equipment worldwide.

In the United States, the prime user of NDBs is the FAA which operates and licenses a network of over 600 beacons. We'll concentrate on those beacons here; however, much of the equipment described is virtually identical to that used for maritime application.

For many years the FAA has used a transmitter based on the ND 200S transmitter manufactured by Nautel Corporation of Maine. It is solid state and produces 25 to 50 watts carrier output (adjustable). It uses crystal-control to cover the range of 190 to 535 kHz. The transmitter has output protection against shorted or open circuits and an automatic shutdown/remote failure alarm system. Front panel metering is provided to monitor output power, antenna efficiency and various internal voltages. The meter provides important troubleshooting information to FAA Maintainers.

Another NDB popular with both government and commercial users is the SR-105 beacon (Figure 3) manufactured by Scientific Radio Systems, Inc. of Rochester, N.Y. I'm told several hundred of these have been installed in the U.S. and abroad. This floor mounted unit produces up to 100 watts carrier output (adjustable) and uses crystal control, or optional frequency synthesis, to cover the range of 200 to 535 kHz.

A key objective in all NDBs is reliability. Many NDBs including the SR-105 can be configured with dual transmitters for main/standby operation. This provides backup operation in the event of a failure in the primary unit.

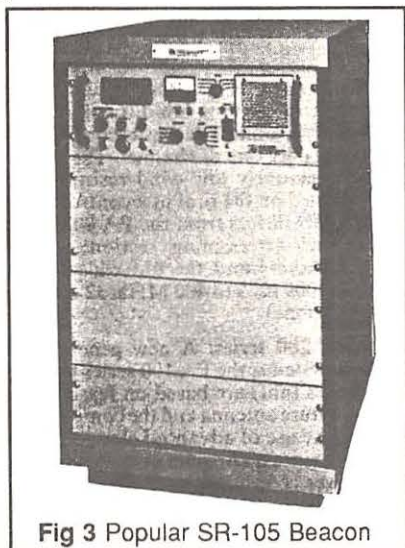


Fig 3 Popular SR-105 Beacon

NDBs are relied upon most when the weather is stormy. Since AC power outages are common during such storms, most NDB sites include provisions for emergency backup power. Backup power is typically supplied from deep-cycle storage batteries kept inside the shelter. The batteries are kept fully charged by a trickle charger. Often, this charger is built right into the transmitter cabinet.

NDB Transmitting Antennas

The type of antenna used at beacon sites varies widely depending on range requirements and available landscape. Because of the long wavelengths encountered on these frequencies (approaching one mile at 190 kHz), self-resonant antennas simply aren't practical. Instead, antenna tuning units (ATUs) are used to couple the NDB transmitter to the shortened antenna, thereby providing an acceptable efficiency.

ATUs are normally installed inside the beacon shelter and automatically tune to account for changing weather conditions at the site. These motorized tuning units are so sensitive that a person or animal walking near the antenna often causes a retune.

A popular type of antenna is the so-called Flat Top T antenna like the one shown in Figure 2. Another antenna, commonly used when space is a problem, is the triangle antenna as shown in Figure 4. Both types are reasonably efficient when used with an ATU and provide reliable daytime ranges of about 100 miles.

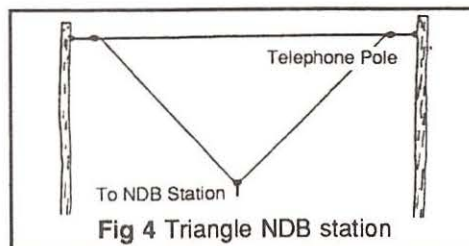


Fig 4 Triangle NDB station

Station Maintenance

An NDB malfunction poses a potential threat to aviation safety and is taken very seriously. Automatic, remote alarm receivers like the one shown in Figure 5 are used at airports and FAA facilities to alert maintenance personnel to a problem with the beacon.

These dedicated receivers are equipped to detect any reduction in signal strength or a loss of CW keying. When a failure is detected, the receiver sounds an audible alarm and activates a flashing LED. The audible alarm can be silenced by pressing a spring-loaded switch. The LED continues to flash however, until a maintenance technician is sent to the site for repairs.

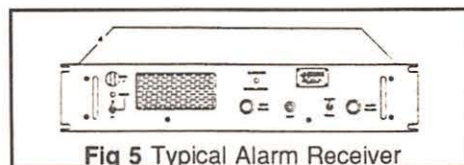


Fig 5 Typical Alarm Receiver

Besides unexpected trouble calls, maintenance personnel also perform routine, preventive maintenance on a quarterly basis. This includes checking wiring connections, taking antenna and power output measurements, cleaning air filters, and battery inspection as stated in the NDB instruction manual. One manual specifies checking antenna poles, insulators and connections with binoculars. Not a bad idea for us to use. A service log at each NDB site shows all repair work and preventive maintenance performed.

Although you probably wouldn't pick one up for recreational reading, I did have a chance to thumb through a typical NDB instruction manual and found some parts of it quite interesting. They describe installation, operation and maintenance procedures designed to get an NDB up and running or restore operation as quickly as possible after a breakdown.

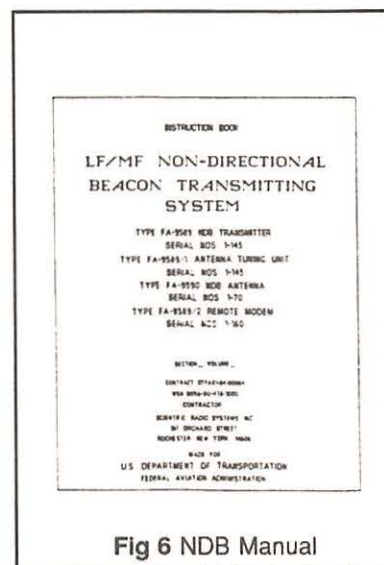
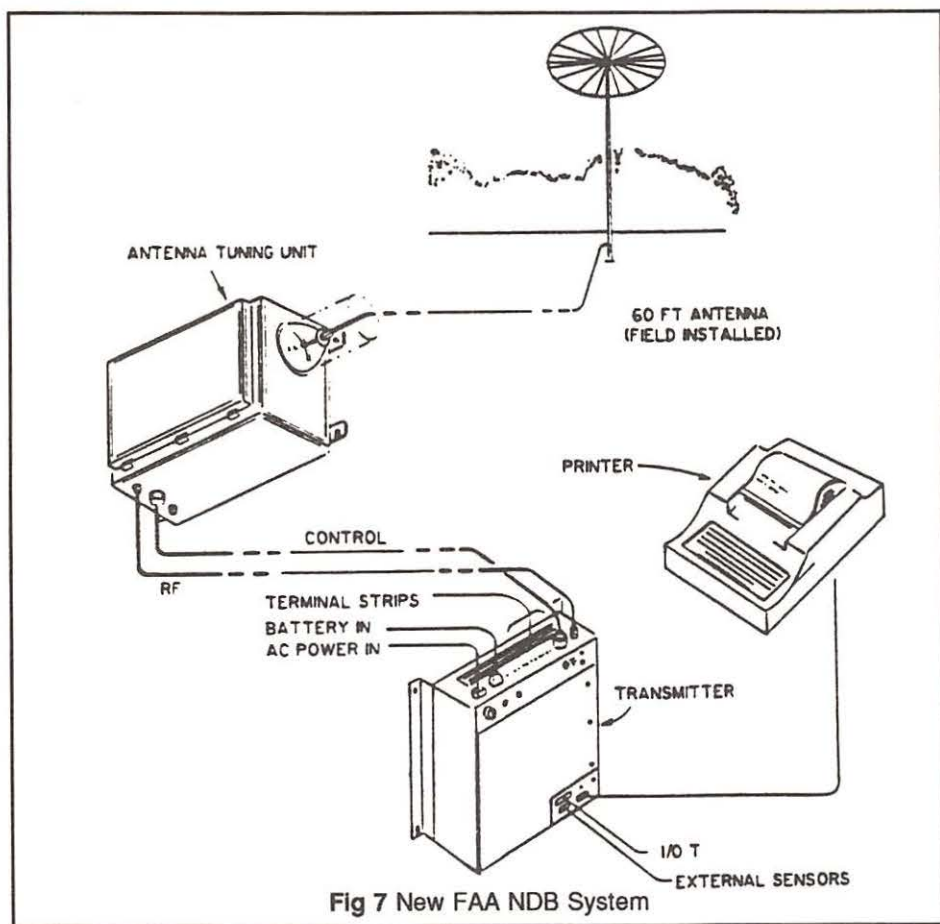


Fig 6 NDB Manual

The manuals are written to meet such exacting FAA specifications, they undergo extensive tests before being accepted. During such tests, intentional faults are introduced into the equipment. Maintainers, using the manual, attempt to troubleshoot and repair the faults within FAA time frames. (If only equipment manufacturers would follow this procedure, we'd have more usable manuals!)

Beacons for the 90's and Beyond

In 1984 the FAA awarded a major contract to Scientific Radio Systems, Inc. for 145 NDB transmitters, 70 transmitting antennas, and 160 alarm receivers as part of an overall NDB upgrade



program. The goal of this 4 million dollar program was to bring the NDB into the computer age. These new units will soon begin replacing obsolete equipment or be used to support new FAA installations.

The specifications for the new system call for a microprocessor-controlled beacon that will support remote configuration and diagnostics from a central office via telephone modem or field diagnostics using a portable or laptop terminal.

Figure 7 shows this new system. The transmitter is synthesized to cover 190 to 535 kHz, and in addition to a CW ID, supports local and remote AM voice transmission. It contains a built-in dialup modem for full remote control. In the convenience of an office setting, an authorized operator with a valid computer password can adjust a beacon's power level, change the CW ID, set the modulation level, and change the transmission frequency! In the past, a person had to travel to the NDB site to do this.

The new system allows maintainers to remotely measure critical voltages and currents to identify problems. This way, the proper spares can be taken to the site the first time, avoiding repeat visits and minimizing downtime.

The system includes provisions for fire and intrusion detection with the addition of external sensors. When any abnormal condition is sensed, the NDB automatically telephones the nearest

FAA office to alert personnel to the problem. In short, this system does everything but fix itself.

A New Antenna

The most obvious change with the new FAA system is with the antenna. In a bold departure from the traditional wire antennas of the past, many new installations use a new fiberglass vertical antenna fitted with a circular top hat (Figure 7). This antenna was specially designed for the prime contractor by Shakespeare Company of Ohio.

The vertical is more efficient and requires far less real estate to erect than any type of wire antenna. There is an extensive array of buried radial wires arranged as spokes of a wheel about the base of the antenna. These 165 foot long radials are used to form a ground counterpoise. Good grounding is crucial for efficient operation at these frequencies. The Antenna Tuning Unit allows operation from 190 to 535 kHz.

The Lowfers

A discussion of longwave beacons wouldn't be complete without mentioning the LOWFERS, short for Low Frequency Experimental Radio Stations. A sliver of spectrum from 160 to 190 kHz is home to this growing group of experi-

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menters who use one watt transmitters with 50 foot long antennas to operate beacons and two-way stations on the license-free 1750 meter band.

FCC Part 15 rules allow operation on this band (any mode) on a noninterference basis. Despite severe power/antenna restrictions, distances over 200 miles are being achieved. Again, the LWCA is an excellent source of information on "lowfing" through "The Lowdown" newsletter. Write them at the address mentioned above.

Conclusion

The rich territory below 500 kHz may be just what you need to add new spark to your hobby. Long overlooked by many, longwave is now enjoying new popularity, and beacon hunting is a great way to get started. Most beacons operate 24-hours a day and their stable signals allow you to leisurely survey the band and learn something about longwave propagation.

Even if your receiver doesn't cover the longwaves, inexpensive outboard converters and other accessories are available from several MT advertisers that will permit reception on a portion of the shortwave band such as 3.5 to 4.0 MHz.

Despite Radar, Vortec, LORAN and other advanced NAVAIDS, NDBs continue to play an important role in aviation and marine safety. This is especially true with the navigator who may not be equipped for using the more advanced systems, or for those needing an auxiliary system.

This means you should be able to enjoy some plentiful DX targets for years to come. Happy hunting.

I highly recommend these books for additional longwave reading:

1. Ken Cornell "The Longwave Scrapbook" considered by many to be the 1750 meter "bible"
2. L. Peter Carron Jr. "The World Below 500 kHz" an excellent overall introduction to longwave



One Man's Opinion

by John F. Henault, N1GDC

During the past several years, those of us who regularly pursue the hobby of public safety monitoring have seen a continual upsurge in the use of encrypted and trunked communications equipment throughout the United States. Allegedly, their use is a response to the professed need to prohibit monitoring by the "criminal elements" in our society. It's my opinion that it's more from a desire to keep the public from knowing what these agencies are doing on a daily basis.

All opinions aside, the following recounts an event where the public's access to such communications provided an invaluable service by notifying them quickly of a serious hazard to life and property.

It happened in the town of Marlboro, Massachusetts, in the middle of a cold night last January. A gasoline tanker truck was making a routine delivery to a local gas station near the center of town when the delivery hose suddenly ruptured, spewing 800-1000 gallons of gasoline onto the

pavement and directly into the town's storm drainage system.

Although the fire and police departments were notified at once, there was no stopping its spread throughout the system. Before any action could be taken, a least one house suffered an explosion in its cellar, apparently when the pilot light of a natural gas heating unit ignited the gasoline fumes seeping into the cellar. A number of drainage manholes also exploded, sending sewer covers many feet into the air.

The potential seriousness of the situation initiated the call-up of the entire police and fire department personnel. It was soon obvious that large sections of the town would require complete evacuation. Ambulances, school buses and other vehicles were pressed into service to transport citizens to hurriedly established shelter sites.

As the situation became worse, officials soon realized that the police, fire and EMS vehicles roaming the streets warning residents to evacuate by means of Public Address systems was not having the desired effect.

It finally dawned on someone to make use of the many scanners used by citizens to monitor public safety frequencies. A decision was made to broadcast the nature of the emergency and the need for evacuation over the police and fire radios. The announcements advised all residents in the area of danger to leave their houses and go to the nearest shelter facilities on foot, or to flag down passing school buses, police cars, or EMS vehicles which would transport them to the shelters.

Prior to the radio announcements to scanner owners, the evacuation process was slow and for the most part ineffective, with the exception of door-to-door notifications by the few personnel which could be spared. After the announcements, the police and fire commanders were heard to comment on the

number of orderly evacuations that were taking place. The evacuation proceeded so well, in fact, that the door-to-door campaign was scarcely needed.

All's well that ends well. Thankfully there were no serious injuries; only a few hours of inconvenience and anxiety. The fact that this town had a great many law-abiding citizens accustomed to listening to scanner radios was a major contribution to the orderly evacuation of 1,000 or so residents in a short period of time without panic.

I can agree fully that there are times when encrypted radio communications are needed to protect the lives of police officers. However, in 23 years of police work, I have had only two occasions where violators actually were using receivers in connection with their criminal enterprises. But can you imagine what would have happened in Marlboro had encryption been in use full-time? People would long ago have stopped listening and a valuable tool would have been lost.

I suggest when people are faced with hard times and budget cuts for public safety agencies, they insist that no monies be spent for system-wide encryption programs. A bare-bones approach could equip a few special units if some encryption is required.

Money is better spent keeping even a single police officer, fire fighter or pieces of equipment in service. These are the people who actually help to serve and save the community when disaster strikes, and the cooperation of an informed community can do the rest.



If you have a story of how radio has played a part in your life or the life of your community, send it to Monitoring Times. All stories should be true, real life events. Manuscripts should be approximately 1,500 words and must include at least one clear illustration or photograph.





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Shortwave Broadcasting

Glenn Hauser

Box 1684 - MT

Enid, OK 73702

AFGHANISTAN (non) Radio Afghanistan rescheduled English to Europe: 1800-1900 on 15510 and 11845 (BBC Monitoring) Presumably Soviet relays

ANGUILLA Caribbean Beacon plans to add more transmitters on 1610 for total power increase; more diesel tanks; and has room for two SW transmitters (George McClintock, *DX Listening Digest*)

ARGENTINA Radio Norte soccer coverage heard via ENTEL on LSB 13890 at 2028 on a Wednesday (Zdenek Elias, Czechoslovakia, WDXC Contact)

ARMENIA (non) Radio Yerevan summer frequencies are 11790, 15180, 15455, English after 0250 (Tom Sundstrom, NJ, *SW Echo* via Kirk Baxter)

BANGLADESH The 1230-1300 broadcast in English heard on 15208 (Ernie Behr, Ont., *World of Radio*) Much closer to nominal 15200 than previous 15605 or 15647 (gh) Another date on 15280 (Richard D'Angelo, PA, *W.O.R.*) Somebody transpose the numbers?

BELGIUM RTBF's death was short-lived(?)—resumed French broadcasts, but relaying domestic service Radio-1: 0500 (Sat & Sun 0600)-0630 on 17680, 7140; 1100-1130 on 25645, 9925; 1600-1715 on 17675, 15540 (BBCM) Last one heard on 21465 again (William Westenhover, PQ) Beware of BRT's *Radio World*—one week they gave several station schedules, including RTBF above, in local time of UTC+2 while repeatedly calling it UTC.

BOLIVIA New on 4530 is Radio Hitachi, Guayaramerin, at 2200-0400 (Andreas Schmid, *WRTH LA-News* via *Radio Nuevo Mundo*) Manager of Radio Galaxia, 5159.5 there is Jeber Hitachi Banegas (Henrik Klemetz, *WRTH LA-News*)

La Voz del Tropic, Villa Tunari, on new 3405, ex-4747, and announcing 3405, heard at 0035 (Rafael Rojas F., Lima, Peru, via Dario Monferini, *W.O.R.*) Later, same station heard on 4456.9 at 0045 (Henrik Klemetz, via *ibid.*)

BOTSWANA VOA will replace all the damaged Monrovia facilities with a new SW site here at its MW location, Selebi-Phikwe (*Sweden Calling DXers* via *DX Ontario* & Wolfgang Bueschel, DSWCI *SW News*)

BRAZIL Radio Sentinela, Obidos, PA on 3285 carries Radio Bandeirantes programs via satellite at 0330-0930 weekends and national holidays, including Banderiantes IDs (Antonio Ribeiro da Motta, Brazil, *W.O.R.*)

CANADA New Communications Minister, who should be pressured to restore full RCI funding, is Perrin Beatty (Wojtek Gwiazda, PQ) Favoring RCI restoration is NDP Communications Critic Lyle MacWilliam, of BC (Williams Westenhover, PQ)

(non) Site of the RCI relay at 0400-0430 on 15445 is Daventry, England (Westenhover)

CANARY ISLANDS REE's Tenerife relay is still used, but only on Saturday and Sunday for a special transmission to mariners at sea; it's very antiquated at a MW site unsuitable for SW, and may be moved to another island (Homero Valencia, RNE-Radio Exterior, on *RN Radio-Enlace*) Details, please!

CHINA Gansu PBS, Lanzhou on 6155 and 4865 at 0130-0540, 0750-1500, 2055-0030 including English lessons daily at 1300-1330, 0000-0030. Guangxi PBS, Nanning on 4915, 0855-1530 and 2150-0515 with English lesson at 1310-1340; Japanese lesson 1405-1435; and rural program in Liuzhou dialect at 1130-1150. Yunnan PBS, Kunming on 7210, 4760 and 2460, 0155-0500, 0835-1500, 2105-0400 with Japanese lesson 1430-1500. All one hour later in winter (BBCM)

(non) Presumably via Taiwan, *Voice of June 4th* programs produced in Chicago at 2100-2200 on 15280 were replaced by another anti-government faction, *Voice of China*, without notice to VOJ4, which is affiliated with the Independent Federation of Chinese Students & Scholars

in the U.S. VOJ4 was already planning to turn over its facilities to Chinese Alliance for Democracy, whose program name was undecided, hoping to start in June, but may not be able to because of *Voice of China* (Tetsuya Kondo, Radio Japan *DX Corners*)

COLOMBIA Radiodifusora Nacional was on 11821.6 causing Cuba to move, and 17902-variable (Ernie Behr, Ont.) Later around 17912 (Bruce MacGibbon, OR)

Station last month on 5535, is actually Ecos Celestiales, heard at 0945-1200, 0145-0400, giving frequency as 5530, and address at sign-off as Apartado Aereo 8447, Medellin (Rafael Rodriguez, Bogota, via Dario Monferini, *W.O.R.*)

(non) Radio Patria Libre returned in May, around 0030-0115, jumping among three frequencies every few minutes to avoid jamming—6260, 6270, 6280 (George Zeller, OH, *A*C*E*) Morning broadcast last month should have read 1130-1215

COSTA RICA Radio for Peace International shifted to 21465 USB, although it overlapped Moscow in Arabic before 2059; and fixed the warble on 15030 so it is now stable. The women's program at 0030-0130 UTC Tuesday-Saturday plus repeats is call FIRE--*Feminist International Radio Endeavor*, and may be expanded to three hours per day. Sometimes two or even three frequencies are jammed, seemingly by the same source. Listeners' observations on this are needed. New QSL policy: quick reply for \$1 or 3 IRCs; eventual reply otherwise; previous arrangement with a sponsor has been dropped, since replies were 10 months late in going out! (RFPI *Mailbags*, after *W.O.R.* on Tuesday and Saturday)

All possible *World of Radio* times, on current repeat schedule: Sun. 2230, Mon. 0500, 1130, 1800; Tue. 2330, Wed. 0500, 1030 1600; Fri. 2100, Sat. 0230, 0800, 1330; Sat. 1930, Sun. 0200, 0830, 1500. The third repeats are seldom heard, except for Sat. 1330. Generally on 15030 and 13630; 21465 changing to 7375 at 0030.

Costa Rican news is supposed to follow *W.O.R.* on Fridays, but RFPI people are usually too busy to do it. Lacking that, try *Costa Rica Today*, Sundays around 1230 on AWR, 9725, repeated at 2430. There, David Gregory announced plans to start testing the former Radio Impacto facilities in June on 5030 and 6150, Spanish only, and 49m antenna aimed south. Had difficulty reaching site due to quake-damaged bridges on way to Cahuita.

Relay site of Radio Nacional de Espanya--Radio Exterior, at Cariari was "opened" by king and queen during April visit, but first tests not until October, regular schedule from December or January; three 100-kW transmitters designed to reach from southern USA to northern South America. Further plans for a relay in the Argentina/Bolivia/Chile border area (*RN Radio-Enlace*)

CROATIA (non) With Yugoslavia falling apart, broadcasts from *Radio Libertas* attracted more attention, via WHRI in Indiana: Monday-Saturday 1600-1700 on 9465, 21840; Sunday 2100-2200 on 13760, 17830. Besides opening and closing announcements, there is usually an English segment of about 5 minutes somewhere in the middle (*W.O.R.*)

Add to this on WHRI, Croatian Radio, Zagreb, apparently a low-quality live phone-feed direct, at 0000-0057 on 7315, announcing that Saturday and Sunday it's also on 9495 (John Mrvica, PA, *W.O.R.*) One UTC Sunday there was nothing on 9495, but on 7315 opening and closing in English, the rest Croatian except for a segment in Italian-accented Spanish. Apparently this relay was undertaken since the Serbs control Radio Yugoslavia in Belgrade.

CUBA Radio Habana Cuba changes: 11950 ex-11820 at 0000-0600; 15140 ex-9505 at 0200-0450--very clear: 17760 ex-11835 at 0600-0800. SSB test continues daily at 0300 in French, 0400-0600 English on 5965; also USB plus full carrier on 11875 in Spanish mornings and evenings (Arnie Coro, RHC *DXers Unlimited*)

Shortwave Broadcasting

The first two "SSB" tests on 5965, 0400-0600 the last Sunday in April and first in May, were *not* through carrier reduced at times, *both* LSB and USB were clearly audible on my R-5000, just like any other AM station" (Ernie Behr, Ont., *W.O.R.*)

CZECHOSLOVAKIA RPI at 0000-0027 on 11990, 11685, 7345; 0100-0130, 0300-0330, 0400-0430 on 11685, 7345, 5930 (Tom Sundstrom, NJ, *SW Echo* via Kirk Baxter)

ECUADOR Radio Nacional Progreso, very good at 0230 on second harmonic 10119-variable (Rafael Rojas, Peru, *Play-DX*) Fundamental varies--5059 jumps to 5065 or 5055 (Ken MacHarg, HCJB *Dx-Partyline*)

Whatever others may report on 6580, I heard Radio Centro, Ambato around 0100, parallel to fundamental 3290 (Rojas, *W.O.R.*)

Radio Nacional plans to import a new transmitter and reactivate 4940. Currently has program *Carta para los ecuatorianos ausentes*, on HCJB 15220 at 1730-1800, QSLable via *DXPL*--but please, no follow-ups for 4940 in 1973! (Rich MacVicar, HCJB *DXPL*)

Ham Radio Today plans a special on taming RF interference, July 31, Wednesday around 1930, UTC Thursday 0100, 0300, 0530 (HCJB)

EL SALVADOR Clandestines are no longer on SW, but FM: Radio Venceremos, daily 0000-0100 and 0200-0300 on 100.7, 99 and 97.8 MHz; Radio Farabundo Marti, daily at 0000-0100 on 90.8 and 90.2 MHz (BBCM) Still possible, especially this summer via sporadic E if you are less than 1400 miles from El Salvador, ideally about 1000 miles, so don't skip the split frequencies!

FRANCE RFI's 1230-1300 broadcast is direct on 21635, via Guiana on 21645 (BBCM) Don't think so--both are equally poor, though after 1300 in Spanish, 21645 booms in (gh) The 1400-1500 on 21770, not 21765 (Williams Westenhaver, PQ) RFI carries an RFO news review for Antarctica, Mondays 0805-0835 on 11660 (BBCM) All winter? (gh) RFI plans to double its power in six years, with 24 transmitters of 500 kW in France; five in Guiana, three in Jibuti, and more in Thailand (RFI via BBCM)

GERMANY DW's DX program in English is on the UTC Sunday following the last Saturday of the month, not the first, e.g. May 26 at 0123-0133 on 15105 and many more, so look for it June 30, July 28. It's too formal, too elementary, too literally translated, and lacking any real DX news, this *World DX Meeting*.

GUAM KTWR in English: Far East 0800-0927 (Fri 0912) on 15200; Australia 0827-0957 on 11805; South Asia 1458-1636 (Sunday 1701) on 11650 (*DX Partyline*)

KHBN has been scheduled for a long time on SW, currently 9820, but government red tape about the land will delay this at least until the end of 1991 (Arthur Cushen, RNZI *Mailbox*)

HONDURAS (See May) HRTW has been licensed by the government and has total permission to operate on 9950 and 15055, perhaps by July or August (Jeff White, *Swiss SW Merrygoround*)

Sani Radio reactivated on new 6299 until 0100, about 1 kW (Terry Krueger, FL, via Dario Monferini)

HRXX, La Voz de la Mosquitia is like a soap opera. After her husband left her, "Miss Pat" Wilkerson changed U.S. sponsors for the station; now claims it has been stolen by the original sponsors and operated from their camp in Yazoo; her new sponsors are trying to get a license for the transmitter still at her Camp Bautista (Don Jensen, WI, *NU* via *RNM*)

HUNGARY Radio Budapest cuts scheduled for July 1 may be postponed until September (Charlie Kuntz, RB, *RNMN*) RB's *What You Say* program predicts club will be retained and DX program still broadcast in some form (Edwin Southwell, England)

ICELAND Rikisutvarpid published new SW schedule in late April: Europe 1215-1245 on 15790, 13830; 1855-1930 on 11402, 13855, 24 hours on 3295, 6100, 9265; North America 1225-1245, 1410-1440, 1935-2010, 2300-2335, all on 13855, 15770 (BBCM)

INDONESIA RRI Wamena changed frequencies and transmitters half a minute before 1200 in March, 4871.2 to 4866.5, and lost strength in the process (David Clark, Ont., *Fine Tuning*)

RPDT2 Berau, Kalimantan Timur, reactivated on new 5691.8 until 1100 sign-off (Geoff Cosier, Australia, *DSWCI SW News*)

Mystery station on 4881 seems to be non-RRI and non-RPD in Irian Jaya, relaying RRI Jayapura news at 0930; local ID at 0943 seemed to mention Senok; a mystery in 1983 on same frequency seemed to be in Fak Fak, so the same transmitter may have grown legs (Geoff Cosier, *Fine Tuning*)

IRAN IRIB's summer schedule came with handwritten note that all times are one hour earlier for DST this year, so English would be at 1030-1130 on 11940, 11790, 11715, 9705, 9575, and 1830-1930 on 9022, 6035 (Jon Johans, Netherlands, *RNMN*) Tehran transmitter carries domestic service on 5995 to remote parts of the country at 2300-2030 (BBCM via *RNMN*)

IRAQ Make that Holy Medina Radio last month, not Media! (non) Voice of Free Iraq location seems certain, as Germans have received QSL cards signed by the BSKSA, Saudi Arabia head of engineering (*RNMN*)

(non) Voice of Free Iraq (*Sawt al-'Iraq al-Tha'ir*), anti-Saddam, pro-Islamic revolution, on 7097, announces two-hour transmissions, but usually last three hours or more, at 0230, 1030, 1530, with news varying around 0630, 1430, 1930 (-- presumably given in local time) (BBCM)

IRELAND Radio Fax, presumably from here, heard on 12255 at 0212 with address in England (Hans Johnson, MD, *W.O.R.*) Good at 0310, better at 0520 (Jerry Berg, MA, *FT*) Radio Fax has offered to relay Caroline 16 hours a day on 6205 and 12255 (*British DX Club*)

ISRAEL Israel Radio warned listeners in May that from June 1, prime-time broadcasts to targets outside Europe, especially North America after 2200 UTC, would likely end, with the money saved put into domestic broadcasting. Ben Dalfen suggested tape-and-timer if necessary to catch the 2130 broadcast. This led to astonished, angry protests from listeners quoted on Sundays' *Calling All Listeners*, some accompanied by donations the station didn't know what to do with. By the way, they refuse to QSL reports unless times are given in UTC.

JAPAN Ian McFarland is frequently heard giving the news at 0300 on 15325 via French Guiana (Bruce MacGibbon and Rich McVicar)

KAZAKHSTAN Radio Alma Ata has another new English broadcast, 2130-2200 heard on 3955, 4400, 5035, 5260, 5960, 5970, 9505, 15215, 15315, 15385, 17605, 17715, 17730 (BBCM)

KOREA NORTH R Pyongyang hides clandestine messages in the revolutionary music it broadcasts (Libor Kubik, Radio Prague *DX Special*, via William Westenhaver, *SPEEDX*)

Two different unknown stations on 3000 and 3025 kHz carry soundtracks of art movies, poetry, dramas, aimed at young infantrymen, including the movie *Nameless Heroes* in Korean and English, daily at 1430-2100 (Toru Yamashita, Radio Japan *DX Corner*) Drive-in harmonics?

KURDISTAN (non) Voice of the People of Kurdistan, in Kurdish and Arabic, 0600-0800 on 7085v, 1700-1900 on 3900 varying between 3800 and 4040; in the past two frequencies in parallel, 15060v, 7100v or 4340v in addition to 3900v (BBCM)

LATVIA Radio Riga, 5935, English Saturday 1730, Sunday 0600, now calling itself Radio Latvia (Edwin Southwell, England)

LIBERIA ELBC, 7275, 0650-0740 mentioned at least four times "with studios in Monrovia," leaving no doubt about its location (Bill Dvorak, WI)

LITHUANIA Radio Vilnius summer sked: 2300-2330 on 11790, 13645, 15180, 15455, best on 15485 (Larry Shewchuk, Manitoba)

MOZAMBIQUE National Program, Maputo, all in Portuguese: 3210 at 0250-0500 and 1700-2210; 4866 at 0250-0500, 4855 (sic) at 0500-0600, 4866 at 1600-2210; 6112 and 7242 at 0250-2210; 9618 at 0400-2210; 11818 at 0500-1700; 15295-variable, 9525-irregular. Sofala-A from Beira 0255-2205 on 3370, 6025; Sofala-B 0255-2255 on 3280, 9637 (BBCM)

NEW ZEALAND RNZI seems to be moving toward listener-support, hawking wares payable via Mastercard or Visa; T-shirts, recordings. Listening to Tony King's upbeat *Mailbox* you'd never know

Shortwave Broadcasting

they have another mailbag show: Rudi Hill, a semi-retired curmudgeon, aired negative comments about the country and foreign visitors, during his show the second UTC Friday at 0430-0500 on 17770, though the printed schedule shows it only on the fourth Friday. Tune in whatever the week--you may instead hear personal calls to and from Pitcairn, Norfolk, and Tokelau. Many other islands are called on 9700: Monday and Wednesday 0810-0900, Tuesday 0905-1000, Friday 0905-0930.

Kiwi Radio operates weekends on 5850 around 0700-0830 (Bryan Clark, NZ via Craig Edwards, WDXC Contact) A pirate, reactivated?

PAKISTAN R Pakistan have English to Europe at 1700-1800 on 11570 and new 15550, but announcing 9370 and 11570 (Edwin Southwell, England)

PALESTINE (non) Al-Quds Radio on 5890 at 0600-1100 and 1300-1730 (BBCM)

PAPUA NEW GUINEA Radio Northern, Popondetta, reactivated with old 2kW on 3345. Sunset varies slightly in summer around 0800 UTC, best time to hear the hardest of PNGs in central North America; in the west, window until co-channel Ternate sunset around 0930; in the east, sweet spot is such that RN dominates frequency into early July (John Bryant, OK, W.O.R.) Presumably even after 0930

PERU Radio Tayabamba reactivated on 4624.6 varying to 4628.6, at 0010-0115 and at 1111-1115, ex-3290 in January 1990; announces "near 4500", very poor modulation and probably off again soon. Radio Del Pacifico again active on 4974.9 at 0245-0300 UTC Sunday, perhaps only for Pentecost (Pedro F. Arrunategui, Lima via Dario Monferini, W.O.R.)

Radio Tigre is new station in Celendin, on about 6780 at 2310. unID in Saposoa on 5420 at 1120-1130 (Rafael Rojas, Lima, *ibid.*)

Authorities are searching for about nine illegal radio stations in the Huaylas valley inciting peasants to subversion, in Quechua, such as Radio Huandoy, Frecuencia 100, Radio San Juan (EFE via BBCM)

PHILIPPINES FEBC on 3330, tentatively from Baco, Mindoro, relaying Manila at 1100, all in Tagalog to 1112 sign-off; scheduled in WRTH-91 on 3345 at 0830-1030 (David Foster, Australia, *Oz-DX*)

RUSSIA More little towns are getting SW stations: Radio Kudymkar, near Perm, on 11770 opening with organola interval signal at 1415, IDs (Geoff Cosier, Australia, *OzDX*)

Radio Yoshkar Ola, near Kazan, on 7200 at 0330-0600, 1500-1600 (Nikolai Rudnev, USSR, WDXC Contact)

Vedo is a new radio station, former jammer, from Volgograd, a private station on the 42 to 50 meter band, multi-ethnic promoting religious tolerance, including programs from DW and VOA; plans to become 20 hours a day and later add MW (All Union Radio, Moscow via BBCM) Frequencies, please!!!

(See May SWBC) Radio Dalniy Vostok Rossiya gives English ID as "Radio Far East Russia"; also at 1600-1900, starting with a relay of Radio Eko, Moscow (Yoshinori Kato, Radio Japan *DX Corner*) On 9560, 9565, and 4050 SSB, each 20 kW non-directional, two in Khabarovsk, the SSB a feeder to Komsomolsk-na-Amure; address is Box 2378, Khabarovsk 680008 (Valery Ostroverkh, Kazakhstan, via Bruce MacGibbon, SW Echo via Kirk Baxter)

SOMALIA Radio Hargeisa, the old government station on 7120, was destroyed in 1988. Now, staff of the former clandestine, Radio SNM have reactivated it on 7121.9 at 1500-1700 as Radio Somali, Hargeisa (BBCM)

SOUTH AFRICA Radio RSA in English: 0400-0500 on 11920, 11860, 5960; 1000-1100 on 17835; 1100-1200 on 11900, 11860, 9555; 1500-1800 on 15210, 7230; 1600-1800 on 17790 (BBCM) Fanus Venter, head of Radio RSA, is leaving to direct SABC's commercial subsidiary to provide journalistic services to overseas radio, TV stations. Since April, Radio RSA expanded by 9 hours a day with more French, English, Portuguese and "black languages"; hopes to add Arabic. Technical head says lots of extra transmitting time is still available for relay of any SW station (EDXC report on *RMNM*) Strings?

TAHITI RFO Tahiti sent map with QSL showing 6135 is 4 kW, beamed 50 degrees towards Marquesas; 11825 and 15170 each 20 kW, 80 degrees towards Tuamotu; 9750 4 kW, 120 degrees towards Gambier

Islands (Kevin Klein, WI)

TRISTAN DA CUNHA In a letter dated 19 Feb. 91, the Administrator writes: "Tristan Broadcasting currently transmits on 3290 kHz, but expects shortly to receive an FM transmitter to replace the existing." Bye bye, Tristan!! (Maarten van Delft, Holland, W.O.R.)

UNITED ARAB EMIRATES Abu Dhabi has resumed English, 2200-2400 on 17855, 15305, 13605 (Mrs. Leslie Edwards, PA) Everything from Islamic sermons to British rock.

UKOGBANI BBC has added 11820 for western Canada at 1300-1400 (weekends to 1500) (via Chris London, MN) Poor here; Delano would be nice, but probably Singapore or Hong Kong.

BBC printed successively contradictory info about its weekday *Caribbean Report*, for 2045-2100, 2015-2030, but it is actually at 2115-2130 on 21660 which is a satellite delay ahead of 15140 which is ahead of 17715, so three different sites; *Australian DX News* reported 21660 would be via VOA-Delano, and 17715 in the past was Greenville; also scheduled on inaudible 6110, no doubt Antigua--but where is 15140, and can the others be pinned down for sure?

UKRAINE (& non) Radio Kiev summer sked, 2100-2200 Europe on 5960; 0000-0100 North America on 15525, 15485, 15455, 15180, 13645, 11790 (Tom Sondstrom, NJ, SW Echo via Baxter)

USA WWCR shifted *World of Radio* on Fridays to 2130-2200; also Saturdays 2330-2400, both on 15690. *Israel Press Review*, Sats. 1230 and Suns. 1745.

Eternal Word TV Network has retained George Jacobs, now in his 50th year of broadcast engineering, for conceptional design and regulatory application for a large shortwave station in Alabama (Jacobs)

VOA has a new midday broadcast in Haitian Creole, heard at 1630-1700, except on a Friday until 1645, on 11890 and 13740 (William Westenhaver, PQ) Daily 1630-1645 on the same plus 17710 (BBCM) 11890 is Greenville 250 kW, 13740 Bethany 250, 17710 Greenville 500 (VOA frequency schedule)

VOA will start a daily half hour broadcast in German, July 4 (*RNMN* and *DW DX-Programm*) VOA recruiters have been in Montreal trying to sign up ex-RCI German staff (Wojtek Gwiazda)

Congress is again considering establishing a Radio Free Asia (bill introduced by Rep. Helen Bentley, R-Maryland), and Radio Free China (Rep. John Porter, R-Illinois). Consultant Maury Lisann says initial investment would be at least \$100 million (Thayer Sibley, *Christian Science Monitor* via Hans Johnson)

USSR Radio Station Peace & Progress, 0130-0200 heard only on 11790 though also announcing 19 and 22 meters (Tom Sundstrom, NJ, SW echo via Kirk Baxter)

Radio Moscow summer schedule changed all main language services to Africa, Asia and Latin America one hour later than previously, no reason given. Now several start or end around midnight in the target (BBCM) Probably for the convenience of staff lacking DST for a change, rather than for the listeners!

VATICAN North American English at 0250-0310 observed on 11625, 9615, 7305 (W.O.R.)

VENEZUELA Radio Nacional changed all their external programming in February, dropping my DX program on Sundays, *YV en Contacto*. Finally quit announcing inactive frequencies, just 9540, but it and MW 1050 have deficient modulation, need 8 megavolts to repair, but no one pays; a new tube alone costs 11 kilodollars. Programming is good, but technically the station is worse than nothing (Manuel A. Rodriguez Lanza, *The Radio News* via *Radio Nuevo Mundo*)

YUGOSLAVIA With civil war looming, their broadcasts should be compelling listening. Radio Yugoslavia devotes 5 to 7 minutes to the crisis before their regular news, at 0000 on 11735, excellent signal (Larry Shewchuk, Manitoba, W.O.R.) See also CROATIA (non)

Keep up with SWBC and other news between MTs by monitoring Glenn Hauser's *World of Radio*, see COSTA RICA and USA; also on WRNO, WHUS, WPKN, WSUI, WOI, and excerpts on *Austrian SW Panorama*. Read much more in *DX LISTENING DIGEST* and *REVIEW OF INTERNATIONAL BROADCASTING*, samples \$2.50 each in North America, 10-issue subscriptions \$25 each in USA, or both for \$47, from Glenn Hauser, Box 1684-MT, Enid, OK 73702

Broadcast Loggings

*Thanks to our contributors -- Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times.
English broadcast unless otherwise noted.*

- 0000 UTC on 6090**
LUXEMBOURG: Radio Luxembourg. Nonstop program of American Golden Oldies, ID and chat with announcer also noting this was "The Best in the Oldies." (Fraser, MA) (Wright, MS)
- 0010 UTC on 9435**
ISRAEL: Kol Israel. Conversation on Hebrew poetry interpretation. Hebrew folk music, ID and program/frequency schedule. Sign off at 0025 UTC. (Bagwell, MO) News on 7465 kHz at 0104. (Carson, OK) (Fraser, MA)
- 0010 UTC on 9675**
BRAZIL: Radio Cancao Nova. Portuguese. Fair signal for local items and news briefs. Portuguese and Spanish pop vocals. Other Brazilian stations observed at this hour were: Radio Novas de Paz on 9515 kHz, and Radio Gaucha on 11915 kHz. Let's hope they QSL. (Roshelli, CA)
- 0015 UTC on 9770**
MALI: Radio Beijing. "Sports Beat" on women's basketball teams in China. (Fraser, MA) RTV Malienne heard on 4784 and parallel 4835.6 at 2215 UTC, with French news, IDs and African music. (Westbrook, OH) (Davis, AL) (Marshall, OH)
- 0100 UTC on 15155**
ECUADOR: HCJB. Feature on Broadcasting in Malta, and "Quito Log Book." Japanese service at 0430 UTC on this frequency, and "Morning In the Mountains" on 21455 USB at 1327 UTC. (Carson, OK)
- 0110 UTC on 11735**
YUGOSLAVIA: Radio Yugoslavia. News and political editorials, suffering from Radio Moscow interference. (Carson, OK) Audible at this hour on 9620 kHz. (Robinson, GA)
- 0130 UTC on 3395**
ECUADOR: Radio Zaracay. Spanish. Time and station ID at the half hour. News briefs followed by ads and jingles, Spanish pops and ballads. Ecuador's Radio Nacional Espejo also heard on 4679.4 at 0145 UTC. (Wright, MS)
- 0138 UTC on 4928.7**
NICARAGUA: Radio Riga. Spanish. Signal drifting from 4927.4/4928.7/ 4930 kHz. Rapid paced Latin vocals with male DJ. Talk and Spanish ballads. ID heard as "Radio informaciones de Centroamerica." Brassy instrumentals and continued talk. Still audible at 0305 UTC. (Pearson, FL)
- 0159 UTC on 9570**
ROMANIA: Radio Romania International. Sign on with ID and news. Discussions followed on political development and economics. Additional monitoring on 9570/ 11940 kHz at 0358 UTC. (Carson, OK)
- 0220 UTC on 4835.1**
GUATEMALA: Radio Tezulutlan. Spanish. DJ reads evening announcements over Guatemalan marimba tunes. Fair-good signal quality for talk, continued marimbas and ID at 0300. Audible the next morning at 1055 UTC with a morning devotional. Guatemala's Radio K'ekchi audible, with religious music duets on 4844.5 kHz at 0240-0305 UTC. (Lee, TX)
- 0230 UTC on 4865**
COLOMBIA: La Voz del Cinaruco. Spanish. Local ads with musical jingles at tune in. Two announcers with sports commentary -- neither very exuberant as is usually the case. Noted same commentary on parallel Caracol Colombia-Bogota, on 6150 kHz. (Pearson, FL)
- 0237 UTC on 4919.9**
ECUADOR: Radio Quito. Spanish. Easy-listening instrumental of "Spanish Eyes" on pan flutes. High static for news format at 0300 and station ID. Audible at 1045 UTC, with morning format, news, and IDs. (Pearson, FL)
- 0240 UTC on 13630**
COSTA RICA: Radio For Peace International. James and Max with "Mailbag" and new SSB frequencies discussed. Other times monitored include: 0307 on 15030, 0543 on 7375 USB, and 0706 UTC on 7275 kHz. (Carson, OK)
- 0250 UTC on 4970**
VENEZUELA: Radio Rumbos. Spanish. Male/female trade announcements on segment "Information." Time checks at 0255 UTC. More chat on Venezuela with phone-in calls. (Bagwell, MO) (Carson, OK)
- 0300 UTC on 15420**
SEYCHELLES: BBC relay. Fair signal for BBC news and features. IDed as the Indian Ocean relay station. Far East Broadcasting Association (FEBA) heard at 0330 on 15250 kHz, with religious format. (Woods, TX)
- 0301 UTC on 5930**
CZECHOSLOVAKIA: Radio Prague International. News and talk on the energy policy in the USSR. DX Special at 0315 UTC. (Carson, OK)
- 0321 UTC on 12035**
SWITZERLAND: Red Cross Radio. Discussion on the Falklands War. Swiss music and sign-off at 0326 UTC. (Carson, OK)
- 0339 UTC on 9545**
ANTIGUA: Deutsche Welle relay. Program on Max Ernst and his art. Discussion on Berlin architecture and what to do on the site of the "late" Berlin Wall. (Carson, OK)
- 0340 UTC on 6010**
VENEZUELA: Radio Los Andes (tentative). Spanish. Two announcers chat about Argentina, with minimal fades and high static. Signal improved by 0352 UTC. Continued chat to 0400 UTC. Time tips at the hour followed by an ID type announcement amid excessive noise. Despite the hash, I was able to confirm a lengthy discussion about the sport of "futebol" in Venezuela. (Van Horn, LA)

- 0348 UTC on 7265**
GERMANY: Sudwestfunk-Rohrdorf. German. Joe Cocker music at tune in. Announcer with titles and comments. (Radio RSA sign-on in background.) High static for continued U.S. pop/rock music and world news at the hour. (Van Horn, LA)
- 0400 UTC on 11695**
FRENCH GUIANA: Radio Beijing relay. Feature on the medical field in China. Radio France relay audible on 15200 kHz at 2200 UTC. (Lee, TX)
- 0407 UTC on 6020**
MEXICO: Radio XEUW. Spanish. Fair signal quality for local ads with jingles. Partial ID noted as, "XEU onda corta 6020 kilohertz banda internacional." Phone-in chats barely audible. Signal peaked once again at 0424 during Spanish vocal ballads. Programming covered at 0429 UTC, with VOA sign-on. Radio Universidad, Mexico, heard on frequency 6115 kHz at 0440 UTC. (Van Horn, LA)
- 0415 UTC on 4419**
PERU: Radio Frecuencia Lider (tentative). Spanish. Male DJ presents music of northern Peruvian/Ecuadorian in origin. Signal very weak with interference. Special thanks to Chuck Boehnke for his assistance on this one. (Witham, HI)
- 0455 UTC on 7370**
TURKEY: Turkish Police Radio. Turkish. Interval signal followed by national anthem and sign-on ID at 0458 UTC. Brief announcements to Turkish style music. Signal too weak for good copy. This log was possible due to the absence of the usual RTTY station on this frequency. (Witham, HI)
- 0545 UTC on 12005**
TUNISIA: Radiodiffusion TV-Tunisienne. Arabic. Good signal quality for Arabic and easy-listening music. Station ID with commentary type feature. Daily afternoon check of Africans revealed this station on 7475 kHz at 2300 UTC. Time pips and ID to Holy Koran recitations. Station sign-off at 2330 UTC. (Marshall, OH)
- 0558 UTC on 4889.7**
SENEGAL: Office De Radiodiffusion-TV Du Senegal. French. Melodic interval signal on a harp. Station sign-on identification with frequency quote included. Fair-poor reception quality for world news topics. African music and occasional chat. (Wright, MS)
- 1000 UTC on 4761**
VENEZUELA: Radio Frontera. Spanish. Choral national anthem, followed by another anthem (state?). Frequency quote for AM (730 kHz) and shortwave (4760). Programming of Latin vocals and ID heard as "Frontera, el radio con la buena musica." (D'Angelo, PA) (SPEEDX)
- 1000 UTC on 4914.6**
PERU: Radio Cora. Spanish. Lady announcer with station ID at the hour as "Esta es Radio Cora onda media, onda corta." Two brief Peruvian vocals and morning type programming. Peru's Radio Eco also audible at this hour on 5097 kHz. (Bagwell, MO)
- 1100 UTC on 4799.8**
GUATEMALA: Radio Buenas Nuevas. Spanish/Mam. Religious programming including gospels, and a brief sermon. Clear station ID at 1130, followed by morning announcements. Contemporary Christian music played on a banjo to ID repeat at 1140. Quite honestly this language sounded more like their local Mam dialect than Spanish. (Pearson, FL)
- 1106 UTC on 4753.3**
INDONESIA: (Sulawesi) Radio Republik Indo-Ujung Pandung. Indonesian. Male announcer reads newscast to musical bridge. Brief talk to pop music. Fair quality signal for DJ's music intros. More talk to easy listening and pops tunes. RRI-Nabire (Irian Jaya) audible on 5055.4 at 1145 UTC. (Van Horn, LA)
- 1155 UTC on 3905**
PAPUA NEW GUINEA: (New Ireland) Radio New Ireland. Pidgin. Finally. A morning without amateur radio interference, revealing island music vocals. Two instrumentals with announcer talk between selections. Station ID and chime type signal at 1200 UTC. (Garcia, PA)
- 1326 UTC on 11685**
PHILIPPINES: FEBC. "Good Evening, Asia" program to news at 1330 UTC. Religious program "Faith in Focus." (Carson, OK) VOA relay monitored at 1900 UTC on 9525 kHz in English. Radio Veritas Asia monitored on 11710 kHz at 2320 UTC. (Clancy, CA)
- 1329 UTC on 11895**
GUAM: KTWR. Interval signal, ID, and religious programming. (Carson, OK) Additional monitoring on 11650 kHz at 1500. (Pearson, FL)
- 1335 UTC on 11910**
AUSTRALIA: Radio Australia. "Australian Comment" program, pop music, and weather report. (Carson, OK) Excellent signal at 1503 UTC on 11720 kHz, with Asian news topics and ID. Opera vocals from Michael Crawford's "Phantom of the Opera." Also audible on 9580 kHz at 1154 UTC, with interview on Asian faiths in Australia. (Lee, TX)
- 1650 UTC on 9370**
PAKISTAN: Radio Pakistan. Pakistani/English. Regional music and talk to 1700 UTC. Station ID, English news on the Middle East, Sri Lanka, India, and Bangladesh. Sports, weather, and commentary followed. (Witham, HI)
- 2220 UTC on 9625**
CANADA: Canadian Broadcasting Corporation-Northern Service. Economic tips for Canadian businessmen dealing with post-war Kuwait. (Fraser, MA)
- 2244 UTC on 4840**
ANGOLA: Emissora Provincial-do Huila. Portuguese. Instrumental music and announcer talk. Station ID, orchestral national anthem to sign-off at 2304 UTC. Additional Angola logging noted as EP do Benguela on 5041 kHz at 2235 UTC. Station ID, African vocal music, and music bridge to 2300 news. (D'Angelo, PA) (SPEEDX)
- 2255 UTC on 11834.8**
URUGUAY: Radio el Espectador. Spanish. U.S. pop/rock music at tune in. Station ID/frequency quote at the hour into international news. Announcer talk, ads, and station promotionals. (Davis, AL)

Terrific logs -- keep 'em coming folks.

Utility World

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Semper Paratus (Always Ready)

Each month I receive tons of great utility frequency logs and, believe me, each and every one of them is truly appreciated. I have noticed that the most reported service in the shortwave radio spectrum seems to be the U.S. Coast Guard. There are a lot of folks out listening to the Coast Guard perform vital missions from drug interdiction to rescues at sea.

Several frequencies show up consistently. Coast Guard air channels seem to be the most popular among listeners, with 5696 kHz leading the pack. 5696 is always hopping with traffic and is primarily a night time frequency when most folks are listening (Work has a nasty habit of interfering with one's monitoring).

But 5696 isn't the only place where Coast Guard action can be monitored. Radioman Second Class Carlos Johnson at Coast Guard COMSTA Boston (NMF) recently sent Gary Oldham a nice list of frequencies and schedules for voice, SITOP, RTTY, and CW Notice to Mariners broadcast, high seas weather, ice information and other scheduled broadcasts for major Coast Guard communications facilities. To both of these gents, a tip of the ole Chief's hat and a big thank you for thinking of *MT's* Utility World column.

Before we share this Coast Guard list with you, here is a little reminder. This is the month of the big marine band shake up. The list of Coast Guard frequencies in Table 1 does reflect the new marine band assignments, so don't fret, you won't miss any activity if you use this special Coast Guard guide presented below after 0001 UTC on July 1, 1991.

The full change of frequencies that will be used by the U.S. Coast Guard can be seen in Table 2..

I hope that you will find the information useful in your Coast Guard monitoring efforts over the next few months. I might add that, as with any transition to new frequency plans, nothing is written in stone. Your reports over the next few months will tell us how the transition is going to these new marine frequencies.

I invite you to listen starting at 0001 July 1, 1991. It should be fascinating to see how the marine community handles the transition to their new frequency plan. I am sure many of us will have some interesting tales to tell at this year's *MT* convention.

MT Convention

Yep, it's not that far away. The first weekend in October is right around the corner. I hope to meet a lot of the regular readers to this column at the convention. I will be giving two specialized talks this year, one on Saturday and repeated on Sunday.

If you are a newcomer to the utility bands, I'll be giving a beginners forum with Skip Arey on Saturday as well.

Friday night, Jack Sullivan will share the podium with me to give you insight into VHF/UHF military monitoring. I will talk about the HF side of the house.

If you are curious, like to be at the scene as it happens, and enjoy mystery and intrigue then be sure to register for the Utility Forums being offered at this year's *MT* convention. After all, only 22% of the HF radio spectrum is devoted to shortwave broadcasting.

Top 10 Frequencies Contest!

After receiving requests for this in the past, I am finally going to do it. Several utility readers have approached me about canvassing the readership of *Utility World* about their favorite utility frequencies. So TODAY jot down your Top 10 favorite frequencies (utility frequencies only) in order, one to ten. Send them to the address in the masthead. I will run this invitation until September 15 to give our overseas readers a shot at participating. I will then compile the results and make the list of *Utility World's* Top 10 available at the *MT* convention and in the November issue of this column.

To add a little spice to the survey, I will draw at random one name from all of the lists submitted. That person will receive a complete print-out of my personal utility station database by frequency. It has over 12,000 entries in it and will be a nice reference source for someone's shack. As always the decision of the judges (me) is final. So get your list of the top ten in the mail today.

Oh yeah, almost forgot, not only should you include the frequency, but be sure to identify who is on each frequency you list (i.e. -USAF, SAC, Navy, Coast Guard, etc) or what the frequency is used for.

Kurdish Frequency?

I just got a QSL card from Michael Lehmppuhl out Colorado way. Mike says he was watching a segment on the Kurdish rebels in Iraq and they showed a close-up of the Yaesu FT radio during the piece. It was close enough Mike caught the frequency they were using--13940 kHz. Just thought a few of you might be interested.

UK Listener Wants to Know?

John Locker over in the UK wants to know what he was hearing on his scanner recently. He has been hearing skip on 33.9 MHz. John, from everything you have told me it would appear you have caught a public safety service from Miami, Ohio. Not a bad catch across the pond if I don't say so myself. Thanks for the nice comments about the column and I hope this helps you out.

Air Force Passes Sports Results

Recently Dick Whittington in Oregon was monitoring the U.S. Air Force ground station on Ascension Island on 13244.0. He heard MAC 2389 calling in for weather at their destination, Riyadh, Saudi Arabia. Ascension was having problems and couldn't get through to Riyadh. It then took 10 minutes to get a weather report from the "21st Air Force Metro group" via phone patch. MAC 2389's final question concerned a college sporting event. Ascension didn't have the score but even in the boondocks, they knew who had won the game. That was the end of the conversation.

As I have said before, you will hear the strange and bizarre in the utility bands, so expect the unexpected. Now let's check in to see what you have been hearing this month in the world of utility intrigue.

Table 1

<p>NCF/U.S. Coast Guard Group Miami Beach, FL 2670 kHz/Voice transmissions at 0350 1550 UTC</p> <p>NMA/U.S. Coast Guard Communication Station Miami, FL 400 kHz/CW transmissions at 0050 1500 UTC 518 kHz/NAVTEX transmissions at 0300 0900 1500 2100 UTC</p> <p>NMA-10/U.S. Coast Guard Group Mayport, FL 2670 kHz/Voice transmissions at 0620 1820 UTC</p> <p>NMA-21/U.S. Coast Guard Group St. Petersburg, FL 2670 kHz/Voice transmissions at 0320 1420 UTC</p> <p>NMB/U.S. Coast Guard Group Charleston, SC 2670 kHz/Voice transmissions at 0420 1620 UTC</p> <p>NMC/U.S. Coast Guard Communication Station San Francisco, Point Reyes, CA 472 kHz/CW transmissions at 0300 0400 0500 1600 1700 1830 UTC 2670 kHz/Voice transmissions at 0203 1403 UTC 4426 8764 13089/Voice transmissions at 0430 1030 1630 2230 UTC 17314/Voice transmissions at 1630 2230 UTC 8714.5 17207/SITOR-B transmissions 0000 1800 UTC 4346 kHz/CW transmission at 0630 UTC 8682 12730 17151.2/CW transmissions at 0030 1900 UTC 8682 12730/CW transmission at 0630 UTC 4346 8682 12730/FAX transmissions at 0145 0300 0500 1500 UTC</p> <p>NMC-6/U.S. Coast Guard Group Monterrey, CA 2670 kHz/Voice transmissions at 0303 1533 UTC</p> <p>NMC-11/U.S. Coast Guard Group Humbolt Bay, CA 2670 kHz/Voice transmissions at 0303 1503 UTC</p> <p>NMG/U.S. Coast Guard Communication Station New Orleans, LA 1432 kHz/CW transmissions at 0100 1500 UTC 518 kHz/NAVTEX transmissions at 0000 0600 1200 1800 UTC</p> <p>NMG-2/U.S. Coast Guard Group New Orleans, LA 2670 kHz/Voice transmissions at 0550 1050 1235 1635 1750 2235 UTC</p> <p>NMK/U.S. Coast Guard Group Cape May, NJ 2670 kHz/Voice transmissions at 1103 2303 UTC</p> <p>NMN/U.S. Coast Guard Communications Station Portsmouth, VA 448 kHz/CW transmissions at 0020 1520 UTC 518 kHz/NAVTEX transmissions at 0130 0730 1330 1930 UTC 4426 6501 8764/Voice transmissions at 0400 0530 1000 UTC 6501 8764 13089/Voice transmissions at 1130 1600 2200 2230 UTC 8764 13089 17314/Voice transmission at 1730 UTC</p> <p>NMN-13/U.S. Coast Guard Group Cape Hatteras, NC 2670 kHz/Voice transmissions at 0133 1303 UTC</p> <p>NMN-37/U.S. Coast Guard Group Fort Macon, NC 2670 kHz/Voice transmissions at 0103 1233 UTC</p> <p>NMN-70/U.S. Coast Guard Group Eastern Shore Chicoteague, VA 2670 kHz/Voice transmissions at 0233 1403 UTC</p> <p>NMN-80/U.S. Coast Guard Group Hampton Roads, VA 2670 kHz/Voice transmissions at 0203 1333 UTC</p>	<p>NMO/U.S. Coast Guard Communication Station Honolulu, HI 440 kHz/CW transmissions at 0500 2100 UTC 2670 6501 8764 kHz/Voice transmissions at 0545 1145 UTC 2670 8764 13089 kHz/Voice transmissions at 1745 2345 UTC 9050 13655 16457.5 22472.5 kHz/CW transmissions at 0100 0300 0400 0600 0700 1300 1700 2000 2200 UTC 8718 13084.5 22574.5/SITOR-B transmissions at 0130 0430 0730 1330 2030 UTC</p> <p>NMQ-8/U.S. Coast Guard Station Channel Island, CA 2670 kHz/Voice transmissions at 1303 2102 UTC</p> <p>NMR/U.S. Coast Guard Greater Antilles Section San Juan, PR 518 kHz/NAVTEX transmissions at 0415 1015 1615 2215 UTC</p> <p>NMR-1/U.S. Coast Guard Greater Antilles Section San Juan, PR 2670 kHz/Voice transmissions at 0305 1505 UTC</p> <p>NMW/U.S. Coast Guard Group Astoria, OR 2670 kHz/Voice transmissions at 0533 1733 UTC</p> <p>NMY-42/U.S. Coast Guard Group Moriches, NY 2670 kHz/Voice transmissions at 0010 1210 UTC</p> <p>NOE/U.S. Coast Guard Group North Bend, OR 2670 kHz/Voice transmissions at 0603 1803 UTC</p> <p>NOJ/U.S. Coast Guard Communication Station Kodiak, AK 470 kHz/CW transmissions at 0530 2000 UTC 6501 kHz/Voice transmissions at 0203 1645 UTC</p> <p>NOQ/U.S. Coast Guard Group Mobile, AL 2670 kHz/Voice transmissions at 1020 1220 1620 2220 UTC (Also remotely keys NOQ-7/Panama City, FL)</p> <p>NOY/U.S. Coast Guard Group Galveston, TX 2670 kHz/Voice transmissions at 1050 1250 1650 2250 UTC</p> <p>NOY-26/U.S. Coast Guard Group Corpus Christi, TX 2670 kHz/Voice transmissions at 1040 1240 1640 2240 UTC</p> <p>NOW/U.S. Coast Guard Group Port Angeles, WA 2670 kHz/Voice transmissions at 0615 1815 UTC</p> <p>NRV/U.S. Coast Guard Communication Station Guam 466 kHz/CW transmissions at 0100 0800 UTC 2670 kHz/Voice transmissions at 0705 2205 UTC 6501 kHz/Voice transmissions at 0930 1530 UTC 13089 kHz/Voice transmissions at 0330 2130 UTC 13077 17203 22567 kHz/SITOR-B transmissions at 0001 0200 0400 0500 0900 1100 1400 2300 UTC (includes 8710 at 1400 UTC) 8150 21760/CW transmissions at 0000 0100 0200 0300 0500 0700 0800 1000 1200 1300 2200 UTC</p>
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Table 2

<p>SHIP Transmit 4134 (old: 4134.3) 6200 (old: 6200) 8240 (old: 8241.5) 12242 (old: 12342.4) 16432 (old: 16534.4)</p> <p>PHONE PATCH frequencies 6212 8195 12278 12323 16396 16471</p>	<p>SHORE Transmit 4426 (old: 4428.7) 6501 (old: 6506.4) 8764 (old: 8765.4) 13089 (old: 13113.2) 17314 (old: 17314)</p> <p>6513 8719 13126 3170 17353 17353</p>
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Utility Loggings

Abbreviations used in this column

Aero	Aeronautical	POL-ARQ	Polish duplex ARQ system
AF	Air Force	PTT	Post, Telegraph and Telephone Administration
AM	Amplitude Modulation	QSY	Change from this to another frequency
ANGOP	Angola News Agency	RAF	Royal Air Force - England
APN	Nowosti News Agency - USSR	RTT	Regie des Telegraphes et des Telephones - Belgium
ARQ	Synchronous transmission and automatic reception	RTTY	Radioteletype
ARQ-96	Standard 96 baud ARQ system	RY	Typical test tape using characters R and Y
ARQ-E	Single channel ARQ system	SELCAL	Selective Calling
ARQ-E3	Single channel ARQ mode	SI-ARQ	Siemens simplex ARQ system
ARQ-M2	RTTY mode sometimes called TDM2-200	SITOR-A	Simplex teleprinting mode A (ARQ)
ASECNA	African Air Navigation agency	SITOR-B	Simplex teleprinting mode B (FEC)
CANFORCE	Canadian Military Forces	SWEDARQ	Swedish simplex ARQ system
COMSTA	Communications Station	TANJUG	Yugoslavian News Agency
CQ	General call for any station	TASS	Soviet News Agency
CW	Morse Code	UN	United Nations
DE	'From', common CW marker	UNID	Unidentified
DTRE	Direction des Telecommunications des Reseaux Exterieurs	USB	Upper Sideband
FAX	Facsimile	USN	United States Navy
FEC-A	One way RTTY traffic system	V marker	CW frequency marker (V VV)
Foxes	A common RTTY test tape	VFT	Voice Frequency
HF	High Frequency (shortwave)		Telegraphy
ID	Identification		(sometimes known as FDM)
IRNA	Iranian News Agency		
KCNA	North Korean News Agency		
MARS	Military Affiliate Radio System		
MFA	Ministry of Foreign Affairs		
MV	Motor Vessel		
NDB	Non directional beacon		
PAP	Polish News Agency		

All times UTC, frequencies in kilohertz. All voice transmissions are English unless otherwise noted.

- 419.0 RYS-Grosse Isle, MI NDB at 0400. (Russ Hill-MI)
- 500.0 GNF-Northforeland Radio, UK with DE CW marker at 2113. DAN-Norddeich Radio, Germany announcing traffic list in CW at 2200. OST-Oostende Radio, Belgium announcing a gale warning in CW at 2312. (Art Boender-Netherlands)
- 516.0 LFG-Rogaland Radio, Norway with CQ CW marker and traffic list at 2200. (Boender-Netherlands)
- 2515.5 MK60 working 3VIW for radio checks in USB at 0615. Mentioned frequency Charlie 697 then RTTY comms established. (Fernandez-MA)
- 2716.0 Goteborg Radio, Sweden with SELCAL using SITOR-A for EZCX at 2116. (Boender-Netherlands)
- 2760.0 NMN13-USCG Group Cape Hatteras, NC with weather broadcast at 0136 in USB. (Neal Perdue-AL)
- 4268.0 Goteborg Radio, Sweden with SELCAL using SITOR-A for TPKX at 2144. (Boender-Netherlands)
- 4438.0 RFFCAI-Guerre Dirsernat Compiegne for RFFHCHS Burosernat Marseille using ARQ-E. Also RFFAB-Ministry of Defense, Paris with message 33775 for RFFHCR cirnil Marseille using ARQ-E at 2032. (Boender-Netherlands)
- 4442.5 RGC72-Kiev Meteo, USSR with RTTY weather messages at 0133. (Boender-Netherlands)
- 4471.0 RFFECSS-French Army Bordeaux, France with ARQ-E messages UFA014/15/16 for RFFGCEMF at 2015. (Boender-Netherlands)
- 4562.6 FDG7-Air Force Cognac with V CW marker at 2155. (Boender-Netherlands)
- 4880.0 FTJ2-Possible Israeli Mossad station, female sending FTJ2 repeatedly at 0000 in AM. (Jack Dix-NY)
- 5680.0 GFF-RAF Pitreavie Air, UK with V CW marker at 2302. Also heard a German male sending 5-figure number groups in AM at 2310. (Dix NY)
- 6227.0 Saudi Prince calling for the Song of America in USB at 0305. (Skip Harwood-CA)
- 6762.5 GHN73 calling D7N66 in USB requesting to QSY to 'NM' at 0331. (USN?)(Bill Battles-NH) No, I think this is an RAF Strike frequency-Larry.
- 6793.0 'DDVB A6AN 6AEN' repeated in CW at 0040. (Joe T.) Nothing here Joe-Larry

- 6802.0 Spanish female 4-digit number station in AM at 0031. (Penson-MN)
- 6872.0 'M94Y M94Y M94Y K' Unid station repeated this in CW every 30 seconds. (Dix-NY)
- 6935.0 Spanish female 4-digit numbers station in AM at 0400. (Harwood-CA)
- 8137.0 Spanish female 5-digit numbers station in AM at 0810. (Harwood-CA)
- 8260.1 IBXJ-Italian registered vessel Isola Delle Stelle working Berne Radio with a phone patch to Buenos Aires, got no answer, said he would call back. At 2356 in USB. (Bill Kiely-Ireland)
- 8288.0 YYCO-Venezuelian registered Jenny Margo working WOM in USB at 0145. (Kiely-Ireland)
- 8291.1 Cayman Island-Cayman Port Authority giving weather information to unid vessel and calling the Harbor Clipper many times with no response in USB at 2305. Also "Malabar?" working M/V Cintran at 2310 in USB. (Perdue-AL)
- 8294.4 KUZ509-Harvey, LA Limited Coastal station working M/V Mr. Pete at 1852 ID'ed as 'KUZ-Harvey' but listed as above. (Perdue-AL)
- 8297.5 UULR-Russian registered Serguei Goussev calling UBN in RTTY 170/50 at 2225. (Kiely-Ireland)
- 8437.0 PKC-Palembang Radio, Indonesia with CQ CW marker at 1348. PKN-Balikpapan Radio, Indonesia with CQ CW marker at 1750. (Dix-NY)
- 8457.0 PKG-Banjarmasin Radio, Indonesia with CQ CW marker at 1050. (Dix-NY)
- 8530.0 UIR-Magadan Radio, USSR with V CW marker at 1131. (Dix-NY)
- 8556.0 SAB44-Goteborg Radio, Sweden with SITOR-A SELCAL for RFBQ at 2000. (Boender-Netherlands)
- 8581.5 XFC-Cozumel Radio, Mexico with CQ CW marker at 0003. (Dix-NY)
- 8598.0 XSL-Fuzhou Radio, China with CQ CW marker at 1107. (Dix-NY)
- 8643.0 UKA-Vladivostok Radio, USSR with CQ CW marker at 1104. (Dix-NY)
- 8838.0 Bored fisherman in aero band talking about weather and how their weather FAX chart looked like a woman's figure at 0415 in USB. (Eric Forslund-CA)
- 8985.0 BT9P-Unid station broadcasting a coded message to FYYC at 1925 in CW. (Dix-NY)
- 9027.0 Margaree (aircraft) working CANFORCE Halifax Military in USB at 2258. (Dix-NY)
- 9140.0 RCV26-ANGOP News Agency Moscow, USSR with RTTY RY test tape at 1905. (Kiely-Ireland)
- 9251.0 Spanish female 4-digit number station in AM at 0415. (Harwood-CA)
- 9365.0 English female 5-digit number station in AM at 0544. (Fernandez-MA)
- 10125.0 Spanish female 5-digit number station in AM at 0312. (Hal Bilodeau-IL)
- 10125.0 Bulgarian male 5-digit number station in AM at 0653. (Fernandez-MA)
- 10407.1 6VU-ASECNA Dakar Air, Senegal with RTTY RY test tape at 1930. (Kiely-Ireland)
- 10665.0 Spanish female 4-digit numbers station in AM at 0020. (Harwood-CA)
- 10888.0 RIT-Moscow Naval Radio, USSR calling UWIJ in CW at 0039. (Dix-NY)
- 10898.0 In LSB, 2 fishing boat captains in comms about 'the group' (18 or so) revising and using the 'code' (frequency/time schedules). One boat was describing how he has the 'code' in a floppy disc and uses his computer to help in communications. Radio models/range was discussed. One boat then sent another boat (using first names only as ID) to another frequency using Portuguese, while all other comms were in English. Seems like most of this group check into this frequency/time to keep in touch with each other. (Fernandez-MA)
- 10932.2 'TEEE 4AVA' repeated over and over in CW at 0330. (Joe T.)
- 11063.0 LZU2-Sofia Meteo, Bulgaria with coded meteo, then CQ marker and RY test tape. RTTY 405/50 at 0604. (Bilodeau-IL)
- 11100.0 07 calling 95 for radio check at 0534 in USB with no joy. Saudi AF frequency. (Battles-NH)
- 11178.0 MAC aircraft working unid ground station at 0330 in USB. (Robert Crane-CA)
- 11215.0 German female 3/2-digit number station in AM at 1927. (Dix-NY)
- 11246.0 Tilly 07 requesting phone patch through MacDill to Specter Ops. Tilly 07 was 80 miles south of Charleston, WV with engine and doppler problems. Told to contact Specter Ops on 4277 or 11237. (Bob Pettengill-OK)
- 11267.0 Several USN units using tactical callsigns at various times in USB. (Thomas Nichols, Sr-IN)
- 11270.5 Unid station with "this frequency is NM, I say again this frequency is NM." There was interference on this frequency from a bubble typesound (jammer) the same as use to be on Radio Teheran when the Iraqi were jamming them. (Kiely-Ireland)

11476.0	Wire photos of 2 Oriental gentleman side by side, dressed in suits. Difficult copy, lots of static. Think this is KCNA Pyongyang, North Korea. FAX 60/576 at 0005. (Bilodeau-IL) <i>Look like it to me-Larry.</i>	18415.0	8BY unid station sending CW V marker at 1944. (Dix-NY)
11532.0	Spanish female 4-digit numbers station in AM at 0200. (Harwood-CA)	18456.0	Jakarta, Indonesia heard with Indonesian news bulletins using 425/50 RTTY at 1024. (Waters-Australia) <i>What news agency is this-Larry?</i>
12684.5	UFM3-Nevelsk Radio, USSR with DE CW marker at 1053. (Dix-NY)	18490.0	RUZU-Molodezhnaya, Antarctica with 120/576 FAX weather charts at 1213. (Waters-Australia)
12690.0	PKG-Banjarmasin Radio, Indonesia with CQ CW marker at 1300. (Dix-NY)	18553.7	RFTJ-French Forces Dakar, Senegal with ARQ-E3 RTTY 'Controle de Voie' at 0956. (Waters-Australia)
12709.0	XFD-Salina City Radio, Mexico with V CW marker at 1415. (Dix-NY)	18561.0	9BC31-IRNA Teheran, Iran heard at 1132 with Arabic news bulletins using 425/50 RTTY. (Waters-Australia)
12711.0	HCG-Guayaquil, Ecuador with CQ CW marker at 1200. (Dix-NY)	18617.0	AGAQA-Unid station calling any station in USB at 1822. (Dix-NY) <i>Jack this was probably a U.S. Air Force MARS station-Larry.</i>
12747.0	KPA2-Israeli Mossad station in AM at 0518. (Fernandez-MA)	18707.0	English female 3/2-digit numbers station in AM at 1825. (Harwood-CA)
12765.0	UCW4/RJFY-Leningrad Radio, USSR with CQ CW marker at 1103. (Dix-NY)	18920.0	GXQ-British Army London, England with RTTY RY test tape at 0813 using VFT. (Waters-Australia)
13568.0	'A' single letter CW HF beacon heard at 1616. (Dix-NY)	19204.8	RFLI-French Forces Fort de France, Martinique with ARQ-E3 idling at 0347. (Waters-Australia)
13582.0	EC3Y-Unid station sending a V CW marker at 1620. (Dix-NY)	19216.7	RFLI-French Forces Fort de France, Martinique with ARQ-E3 idling at 0630. (Waters-Australia)
13905.0	RUZU-Molodezhnaya, Antarctica with 425/50 Russian RTTY messages at 0849. (Waters-Australia)	19576.0	ORI59-RTT Brussels, Belgium with ARQ-96 messages at 1510. (Waters-Australia)
13906.1	VER-Canadian Forces Ottawa, Ontario Canada using ARQ-M2 idling at 2340. (Waters-Australia)	19823.9	4UA-UN station Rawalpindi, Pakistan with 425/50 RTTY RY test tape at 0733. (Waters-Australia)
13968.0	9UA-Usumbura Air, Burundi with 425/50 RTTY RY test tape at 1705. (Waters-Australia)	19845.0	RWZ74-TASS Moscow, USSR with 425/50 RTTY English news bulletin at 1220. (Waters-Australia)
13996.5	STK-Khartoum Air, Sudan with 425/50 RTTY air messages at 2249. (Waters-Australia)	19858.0	NPN-USN COMSTA Apra Harbor, Guam with 120/576 FAX weather charts at 0506. (Waters-Australia)
14405.0	UN Headquarters Geneva, Switzerland with messages to Cairo for further relay to Lebanon/Syria/Saudi Arabia/Yemen in SITOR-A at 0815. (Kiely-Ireland)	19980.0	9BC33-IRNA Teheran, Iran heard at 1209 with Arabic news bulletins using 425/50 RTTY. (Waters, Australia)
14438.0	5USN working AAT7ME with military MARS phone patch traffic to U.S. 7ME mentioned Germany, noted at 2345 in USB. (Perdue-AL)	20181.0	6RSU transmitting coded messages to M7IT in CW at 1850. (Dix-NY)
14465.0	NNN0CQL-USS Lynde McCormick (DDG-8) working NNN0NRU with phone patch traffic at 1928. CUJ audio was poor. (Pettengill-OK)	20204.0	YZJ-TANJUG News Agency Belgrade, Yugoslavia with 425/50 RTTY RY test tape heard at 1331. (Waters-Australia)
14467.0	NNN0CWG-USS Peleliu (LHA-5) with phone patch traffic at 1855 in USB with NNN0NUW. (Pettengill-OK)	20328.0	RIW-Khiva Naval Radio, USSR calling RMEW in CW at 1644. (Dix-NY)
14477.0	NNN0CUJ-USS Vulcan (AR-5) working NNN0MCP with phone patch traffic in USB at 1928. CUJ audio was poor. NNN0CXR-USS Sirius (T-AFS-8) working NNN0RWO in USB at 1828. NNN0NRU working NNN0NCE-Kure Island at 2045 in USB discussing phone patch schedules. (Pettengill-OK)	20418.0	SNN299-MFA Warsaw, Poland with Polish messages using POL-ARQ RTTY at 1416. (Waters-Australia)
14459.8	RFTJD-French Forces Douala, Cameroon with ARQ-E3 with 'Controle de Voie' at 2215. (Waters-Australia)	20700.0	SAM-MFA Stockholm, Sweden with SWED-ARQ RTTY messages for Aden and Algiers at 1230. (Waters-Australia)
14486.0	RFGW-MFA Paris, France using FEC-A mode at 0815 sending 5 letter groups.	20750.0	OEC-MFA Vienna, Austria with SI-ARQ RTTY messages at 0812. (Waters-Australia)
14498.0	SUC-Cairo Air, Egypt sending 850/50 weather information at 1030. (Waters-Australia)	20775.0	NRV-USN COMSTA Apra Harbor, Guam sending CW satellite information at 0819. (Waters-Australia)
14845.0	RFFVIT-French Forces Comoro Islands with ARQ-E idling at 0238. (Waters-Australia)	20822.0	RFFXI-French Forces Bangui, Central African Republic with an ARQ-E transmission consisting of 5-letter groups at 0636. (Waters-Australia)
14855.0	MKD-RAF Akrotiri, Cyprus using VFT at 0734. (Waters-Australia)	20825.0	CLP45-Cuban Embassy Luanda, Angola with RTTY 425/50 5-letter groups at 0535. (Waters-Australia)
14930.0	German female 3/2-digit number station in AM at 2112. (Fernandez-MA)	20872.0	RFFX-French Forces Paris, France using ARQ-E sending 5-letter groups at 1553. (Waters-Australia)
14950.0	RWM79-APN Moscow, USSR with French news bulletins using 425/75 RTTY at 0726. (Waters-Australia)	20933.5	SOV293B-PAP Warsaw, Poland using SITOR-B sending Polish news bulletins at 1227. (Waters-Australia)
16188.0	SVD6-Athens Radio, Greece with DE CW marker at 1615. (Boender-Neth)	20946.0	8BY-Unid station sending V CW marker at 2042. (Dix-NY)
16300.0	RMD59-APN Moscow, USSR with Portuguese news bulletins using 425/75 RTTY at 1105. (Waters-Australia)	22120.9	J4BS-Heliopolis calling an unid station at 1713 in USB. (Hill-MI)
16310.0	Spanish female 4-digit number station in AM at 1836. (Bilodeau-IL)	22415.0	RKLM-Arkhangelsk Radio, USSR calling 4LY in CW at 1500. (Dix-NY)
16323.0	RFTJD-French Forces Douala, Cameroon with ARQ-E3 idling at 0547. (Waters-Australia)	22500.0	SVF7-Athens Radio, Greece at 1457 with DE CW marker. (Boender-Neth)
16352.0	BCC22-PTT Shanghai, China with 425/50 RTTY RY test tape at 0555. (Waters-Australia)	22591.0	CUL-Lisbon Radio, Portugal working MVV lhav using SITOR-A at 1500. (Boender-Netherlands)
16587.1	KHT-Cedar Rapids, IA working tanker KDRP-Seabulk Challenger at 2055 and KLEZ-Overseas Arctic at 0134 in USB. (Hill-MI)	22791.0	RBK70-APN Moscow, USSR with English Novosti press agency news using 425/100 RTTY at 1104. (Waters-Australia)
16661.0	UHZA-MV Maksim Rylskiy working Portishead Radio with a message to Casablanca at 1124 in SITOR-A. (Kiely-Ireland)	22843.0	RHA49-APN Moscow, USSR with Spanish news bulletins from Novosti press agency using 425/100 RTTY at 1057. (Waters-Australia)
16956.0	PZN-Paramaribo Radio, Surinam with CQ CW marker at 1750. (Dix-NY)	22948.0	RPFN-Portuguese Naval Radio Lisbon with RTTY Foxes test tape at 1555. (Boender-Netherlands)
17064.8	EDZ6-Aranjuez Radio, Spain with DE CW marker at 1610. (Boender-Neth)	22990.0	Ascension Island operator with phone patch from Ascension paired with 20192.0 NASA VFT at 1445. (Larry Williams-SC) <i>20192 is Ascension and 22990 is Patrick AFB, Florida-Larry.</i>
17497.0	BAO2-PTT Beijing, China with 425/50 RTTY RY test tape at 0558. (Waters-Australia)	23117.0	PHWR-Hickam AFB, HI with 120/576 FAX weather charts at 0626. (Waters-Australia)
17520.0	REM55-APN Moscow, USSR with 425/100 RTTY english news at 0538. (Waters-Australia)	23325.0	01 working 07 in USB at 1638, then QSY to 'Quebec'. (Battles-NH) <i>This is a NASA channel Bill-Larry.</i>
17982.0	Unid aircraft and ground station with phone patch at 1656. Need help in ID'ing this one. (Battles-NH)	23512.8	PHWR-Hickam AFB, HI with 120/576 FAX weather charts at 0204. (Waters-Australia)
18060.0	AXI36-Darwin Meteo, Australia with 120/576 FAX weather charts at 0942. (Waters-Australia)	24458.8	FJY3-DTRE Dumont d'Urv, Amsterdam Island with ARQ-E messages to RFGWat 0723. (Waters-Australia)
18195.0	German female 5-digit number station in AM at 1616. (Dix-NY)		

The Scanning Report

Bob Kay

c/o MT, P.O. Box 98
Brasstown, NC 28902

Scanning the Weather

Think quickly—what is the one factor that can transform a mundane scanning day into an action packed thriller? If you guessed the weather, you're absolutely correct.

Summer thunderstorms can down trees and play havoc with electric power lines. Winter storms can cover the highways with an impassable blanket of snow and ice. Spring rains and thawing snow can cause widespread floods and incredible destruction.

When the weather changes, the action on your scanner radio changes. Experienced scanner buffs will often compile a list of emergency frequencies that can be monitored during adverse weather conditions. If you're unsure of how to set up your seasonal emergency frequencies, here are a few hints to help you get started.

Since the summer thunderstorm season is already here, let's begin by compiling a frequency list titled, "Summer Storms." This list should include your local police, fire and ambulance crews. You may also want to add the standard medical and medivac helicopter frequencies for your area.

Electric company maintenance crews will be extremely busy during violent thunderstorms. Radio communications will be at their peak during the storm and for several hours after the storm has passed. In large cities, your local power company may have a special frequency that is only used during severe weather. The same may be true for your telephone, water and gas companies as well.

In addition to monitoring utility companies, don't forget to scan the business frequencies. Inclement weather also affects private contractors, delivery vehicles, taxi cabs, and hundreds of other agencies too numerous to mention. Here in the northeast, I often monitor a large plumbing contractor. As the weather changes, the contractor is forced to adjust his schedule and to reassign work crews. As a result of these last minute changes, the contractor's radio frequency will often provide some very quarrelsome and off-beat communications.

Scanner buffs that live near coastal waterways should also compile a list of maritime frequencies. Fast moving thunderstorms are a serious threat to recreational boaters. To hear the scanning action, monitor the Coast Guard and navigational frequencies.

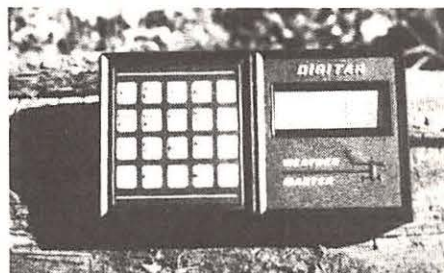
Your monitoring endeavors should not be limited to land and sea communications. Severe weather also affects air travel. Control tower and ground frequencies will become quite active as planes are held in the air and on the ground.

When the summer season ends, don't retire your summer frequencies. You'll probably discover that your summer frequencies are also active during the fall and winter months. The only way to sort them out is to monitor your local weather conditions during all four seasons. You can get a head start on compiling an emergency scanning list by contacting a local scanning club. Most clubs will be happy to provide an up to date listing of emergency frequencies.

While it may take an entire year to build your customized emergency frequency list, the effort is worth the trouble. If you start now, by this time next year you'll have compiled a comprehensive emergency frequency list that will be the envy of fellow scanner buffs.

Treasure Hunt

At the beginning of this column, I asked you to think about the weather and its affect upon scanning. If you're an experienced scanner buff, you've probably already monitored radio communications during all types of weather.



The "Weather Master" by DIGITAR is a state of the art weather station that you can win. Check out the details in this month's Treasure Hunt.

But I know something that you can't monitor. You can't sit at your listening post and instantly access your local weather information. Sure, you could monitor the local NOAA weather frequency, but that's not what I'm talking about.

Right now, at this very moment, what's the temperature outside your window? What is the inside temperature? Quick, push a button and tell me the wind speed and direction. Think about it for a moment. Wouldn't it be great if you could professionally monitor the weather from within your listening post? Imagine the thrill of being able to monitor a -20 degree wind chill from the cozy and warm confines of your favorite chair.

Better yet, imagine a professional quality weather station that could easily be attached to your existing antenna support. Sound too good to be true? If so, you haven't seen the "Weather Master" by DIGITAR.

The folks at DIGITAR have donated their state-of-the-art "Weather Master" as a prize in our July/August Treasure Hunt. The Weather Master is a complete weather station that includes a precision anemometer, wind vane, and outside temperature sensor. As I mentioned earlier, the anemometer and weather vane are a complete unit that can be easily bolted onto your existing antenna support. DIGITAR has thoughtfully provided 40 feet of lead-in cable at no extra charge. Additional lengths are available at a reasonable price.

If you win the Weather Master, you won't need to completely rearrange your listening post. The microprocessor control unit features a lighted, digital display, that is slightly larger than the keypad on a Pro-2005. Here are the exact measurements: 2.7" x 5" x 1.3".

Now that I've got your adrenalin pumping, here are the clues:

1. Falling barometric pressure usually indicates fair weather. True or False?
2. What is the meaning of the abbreviation, "NOAA?"
3. Name a scanner radio that has an instant weather access button.
4. Name the four (4) basic cloud formations.
5. Convert 70 degrees fahrenheit to celsius.

The Weather Master retails for \$295.00. DIGITAR has two lower priced units; the "Weather Pro" and "Weather Data" sell for \$239.00 and \$189.00 respectively. To receive DIGITAR'S catalog, give them a call at 1-800-678-3669. If you prefer to write, here's the address: 3465 Diablo Avenue, Hayward, California 94545.

In the meantime, send in your answers, and keep your fingers crossed. If you're chosen as our lucky winner, your Weather Master Station will allow you to measure the following: barometric pressure, altitude, wind speed, high wind gust, wind direction, inside/outside

temperature, windchill, accumulated rainfall (with optional rain collector), with alarms and settings for temperatures, time and wind speed, scan function, instant metric conversions, and battery or AC operation.

Frequency Exchange

Welcome to Montgomery, Alabama. Rich Vickery lives nearby and here are a few of his favorite frequencies:

State Police	City Police	Sheriff
154.920	460.025	154.950
155.445	460.200	159.150
155.505	460.350	
	460.500	
County Jail	City Maintenance	Utilities
460.0625	153.410 Water	158.160 Gas
	155.760 Trash	158.250 Gas
	453.775 Maint	451.575 Elect
Business		Maxwell AFB
151.835 Waltrip Wrecker		164.175 Security
461.025 Colortyme Rental		173.4375 Hospital
464.300 MARC Buses		173.5375 Fire Dept.
464.375 MGM Security		
854.6125 Federal Express		
Railroads	Fast Food	
160.260	35.02 MacDonalds	
160.365	460.8875 Burger King	
160.380	462.7625 Kentucky Fried Chicken	

If you want to receive Rich's two page list, here's the deal. Send \$2.00 dollars and a #10 SASE to; Frequency Exchange, P.O. Box 98, Brasstown, NC 28902. When I receive your request, I'll also throw in several pages of frequencies for the cities of Birmingham and Fort Payne.

Are feeling a little warm? Let's travel up to South Carolina, and visit Myrtle Beach. As you leisurely stroll along the beach, look for Doug Adams. Doug will be lying on a beach blanket with his scanner radio. A few of his favorite frequencies are listed below.

Myrtle Beach	Business
154.800 Area wide Police	151.685 Lake Arrowhead
154.860 Beach Police	151.775 Ponderosa Camp
155.400 Rescue to hospital	151.805 Boardwalk Hotel
453.900 Coast Guard, coastal patrol	461.400 Lacks Beach Serv.

Are your feet tired of all that sand and water? Dry them off at the races! Here are a few race car frequencies that were sent in anonymously:

461.050 Lenny Pond	463.700 Cale Yarborough
461.270 Dave Marcus	464.800 Richard Petty
463.462 Kyle Petty	465.537 Morgan Shepard
Charlotte NC Speedway Operations	
153.290 Wireless mikes	455.650 FM broadcast link
161.640 "	464.500 Race control tower
169.990 "	464.725 Security
451.895 Parking	473.225 Parade
454.600 Operations	

Got your shoes on yet? You'll need them for our next, and final stop. Michael Silber has invited us to Antelope Valley, California. According to Mike, Antelope Valley is near Lancaster, and Palmdale.

GUIDE TO FACSIMILE STATIONS

11th edition • 408 pages • \$ 33 or DM 50

The recording of FAX stations on LW and SW and the reception of meteorological satellites are fascinating fields of radio monitoring. State-of-the-art hardware and software connects a radio receiver directly to a laser printer. The result is press photos, satellite pictures and weather charts in top quality.

The new edition of our FAX GUIDE contains not only the usual up-to-date frequency lists and transmission schedules, including those of all US Air Force, US Coast Guard and US Navy stations worldwide. It informs you particularly about new FAX converters and programs on the market, and includes the most comprehensive international survey of the "products" of weather satellites and FAX stations from all over the world. 312 sample charts and pictures were recorded in 1990 and 1991. Here are that special charts for aeronautical and maritime navigation, the agriculture and the military, barographic soundings, climatological analyses, and long-term forecasts, which are available nowhere else.

- Additional chapters cover
- List of 341 frequencies monitored in 1990 and 1991.
 - Exact schedules of 86 FAX stations on 313 frequencies.
 - Geostationary and polar-orbiting meteorological satellites. Schedules of GMS (Japan), GOES-East and -West (USA), and METEOSAT (Europe).
 - Technique of FAX transmission. International regulations.
 - Lists of abbreviations, addresses, and call signs. Test charts.

Further publications available are *Guide to Utility Stations* (9th ed.), *Air and Meteorological Code Manual* and *Radioteletype Code Manual* (11th ed.). We have published our international radio books for 22 years. They are in daily use at equipment manufacturers, monitoring services, radio amateurs, shortwave listeners and telecommunication administrations worldwide. Please ask for our free catalogue, including recommendations from all over the world. All manuals are published in the handy 17 x 24 cm format, and of course written in English.

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42.180	Blue mobile
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L.A. County Sheriff

470.7875	SRC access
470.9125	"
482.8125	C-Tac 1
482.8375	C-Tac 2
483.3125	Detectives
483.4125	Special Operations

Do you want the Frequency Exchange to visit your area? If so, send your list of favorite frequencies to the, "Frequency Exchange, P.O. Box 98, Brasstown, NC 28902."

Need frequencies for another area? Drop me a short note. If I don't have 'em, I'll print your request and ask other MT readers to help.

Scanning Test

Thanks for sending in all those encouraging letters. Your comments and suggestions concerning the Scanning Test are greatly appreciated. Many of you heard about the Scanning Test on local computer bulletin boards. Thanks for spreading the news and recommending the test to other scanner buffs!

Your letters are testimony to the fact that most of you want to keep all three testing levels. However, you also made it clear that you wanted

the option of skipping directly to the Expert Exam. Other members expressed a desire to receive their graded answer sheets.

As I said in a previous column, this is your club, and your input is vital to our success. Beginning this month, new members now have the option of taking all three tests, or skipping directly to the Expert Exam. And every candidate receives a graded answer sheet with their certificate.

Do you want to become a member of an exclusive "Scanning Communications Expert Club?" If so, send \$10.00 dollars to "Novice Test," P. O. Box 695, Honey Brook, PA 19344. You can skip the first two test levels, and take the Expert Exam by sending \$30.00 dollars to the above address.

Although the choice is yours, I suggest that you take each test. It helps to familiarize you with the questions and to build your confidence. Good luck!

Computer Corner

As we all know, a personal computer (PC), can add a lot of enjoyment and organization to the hobby of scanning. In today's market, there are dozens of programs that can store, sort, and recall hundreds of frequencies in seconds!

If you're currently using a PC in your shack, here's your chance to share what you have learned. Send your scanning programs and frequency disks to: Computer Corner, P.O. Box 173, Prospect Park, PA 19076. When you send in a disk, be sure to use a "disk mailer." It's the best way of assuring that your disk will arrive in good condition.

Next month, I'll share what I have received, and I'll give everyone the opportunity to try out the more favorable programs.

Scanner Buffs Assist Police

In Spencer, Massachusetts, the police chief ordered his local officers to stop using encoding units to scramble police radio transmissions. According to the Chief, the clear voice transmissions help citizens with scanner radios to assist in the neighborhood crimewatch program.

To deter crime in his town, the chief regularly broadcasts reports of suspicious persons or vehicles over the town's police frequency. "We've got nothing to hide, and everything to gain." The Chief remarked.

A "tip of the typewriter" to the Spencer Police Chief! Instead of trying to restrict the public from listening, he invited everyone to join in. I'd be willing to bet that the crime rate in Spencer will begin to decline. If you live near the town of Spencer, don't forget to send in an updated report. (News clipping from Russ Hanam).

Cellular/Scanner Buff Tips Police

A Virginia Beach scanner buff was cruising along the shore when he heard about a jewelry store robbery on his scanner radio. The police dispatched the suspected vehicle as a white Cadillac with Ohio plates.

"All of a sudden, I realized that the white Cadillac was right in front of me. I called the state police on my car phone, and the police asked me to follow the vehicle at a safe distance."

The scanner buff, who asked for anonymity, stayed on his car phone and followed the robbery suspects until State Police arrived and stopped the vehicle.

Scanner Buff Helps Pilot

It was 5:30 PM on a lazy summer afternoon. Roger West, was listening to his scanner when he heard a distress call on the aircraft emergency frequency. The pilot of a single engine plane announced that he was attempting an emergency landing in an open farm field, just south of Rush City, Wisconsin.

Roger immediately called the local sheriff and alerted them to the situation. The sheriff took Roger's phone number and address and said that they would investigate. Several days later, the pilot of the plane called Roger and thanked him for alerting the authorities. The pilot explained that he had landed safely and that he was grateful to Roger for relaying his distress call.

Don't you just love it when a fellow scanner buff helps to solve a crime or save a life? (News clipping from the *Virginian Pilot*.)

Cellular Phones Increasing

In the United States, 5.3 million people have cellular phones in their cars. According to the cellular telephone industry, the increase in subscribers helped to decrease the monthly service charge. If the growth rate continues to soar, the monthly user fee will also continue to decline. In a few years, it is expected that one out of every five cars will have a cellular phone.

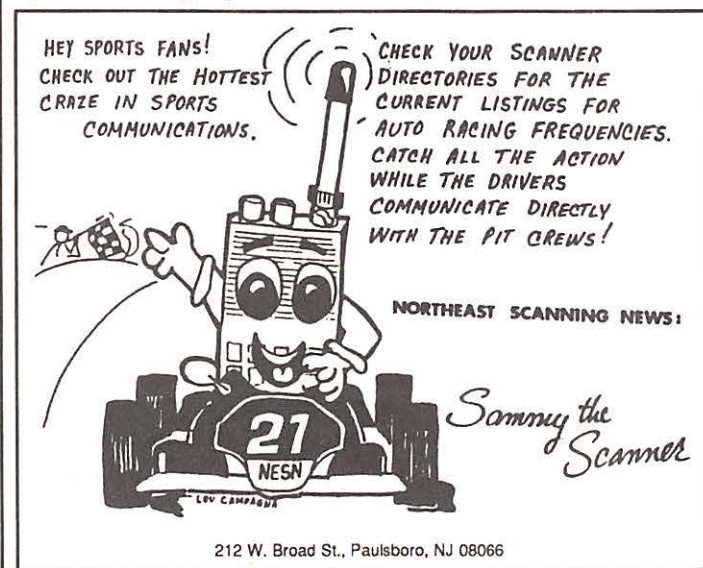
With wholesale prices dropping about 22 percent a year, the cellular folks are now beginning to admit that digital technology may be placed on hold. The average price of a low end cellular phone is currently around \$280.00 dollars. The new digital phones are expected to cost between \$800.00 and 900.00 dollars. The cellular folks realize that their customers will not be willing to purchase a digital car phone that costs three times as much as an analog phone.

In addition to the cost, digital phones are expected to be much heavier than regular car phones. Portable digital phones will be three to four times heavier than conventional units. As you can imagine, the increased weight, and cost, has the cellular industry worried.

One cellular industry spokesman, put it this way. "Is there a market for a \$900.00 hundred dollar portable car phone that will feel like a lump of lead in your pocket?"

Calling All Scanner Buffs

Have you, or someone you know, used a scanner radio to assist police in nabbing a criminal? If so, I'd like to hear about it. Not very good at writing? Don't worry about it. Just tell me what happened in your own words—I'll do the editing. Here's the address: The Scanning Report, P.O. Box 98, Brasstown, NC 28902. See ya' next month!





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Features include simple programming of the following frequency ranges: 29-54 MHz, 118-175 MHz, 406-512 MHz. Turboscan, digital display, priority, search, lockout, delay, dim control, top mounted speaker, one year factory warranty. Includes AC & DC cords, mobile mounting bracket, telescope antenna. All for only \$138.99 plus \$7.00 shipping. (Optional extended warranty: 3 years \$39.99, 2 years \$29.99.)

UNIDEN BEARCAT BC-400XLT

\$99.99



(Our best selling mobile scanner, 16 channel, AC/DC, programmable, digital, AC/DC cords, telescopic antenna, mobile mounting bracket, weather search, priority, 29.54 MHz, 136-174 MHz, 406-512 MHz, external speaker and antenna jack.)

REGENCY R-4020

**100 Channel Digital
Programmable
Hand-Held Scanner**

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(\$7.00 shipping)



Our best price ever on a full featured complete package hand-held scanner. Manufactured by Uniden, this is the exact duplicate of the Bearcat 100XLT for a much lower price. Features include 11 bands of weather, aircraft, public service, trains, marine, plus more (29-54 MHz, 118-174 MHz, 406-512 MHz), 10 channel banks, 10 priority channels, lighted LCD display, earphone jack, channel lockout, AC/DC operation, scans 15 channels per second, track tuning. Special package deal includes following accessories: AC adapter/charger, rechargeable Ni-Cad battery pack, flexible rubber antenna, carry case.

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**SHORT WAVE
RECEIVER**

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AM/FM/LW and 12 shortwave bands plus FM stereo, BFO for SSB reception, clock radio. Includes AC adapter, telescopic antenna, stereo headphones, and shoulder strap.

—SHORT WAVE WORLD BAND RECEIVERS AVAILABLE—

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Grundig Yacht Boy 220	106.99	(5.00)
Grundig Cosmopolit	198.99	(7.00)
Grundig Yacht Boy 230	149.99	(5.00)
Grundig Satellit 650	899.99	(20.00)
World Radio & TV Handbook (1991)	18.99	(*)

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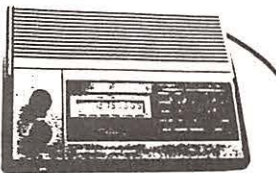
\$69.99 (2 or more)



Features include: 10 programmable channels, one touch memory programming, external speaker jack, 29-54 MHz, 136-174 MHz, 400-512 MHz, squelch, lockout, full frequency digital readout, AC or DC operation, retains memory up to 3 days without power, scan button. Includes AC adapter, telescopic antenna, and complete operating instructions. Size: 7 1/4" W x 2" H x 7 1/4" D. One year factory warranty. (Optional mobile cigarette lighter cord #901MPC \$4.99).

Regency R3020

\$96.99 (\$7.00 Shipping)



20 channel digital programmable scanner, frequency coverage 29-54 MHz, 108-136 MHz aircraft, 136-174 MHz, 406-512 MHz. Features: weather key, search, lockout, priority, squelch, AC only, delay button. Size 9 1/2" x 2 1/2" x 7".

UNIDEN BEARCAT BC-600XLT

\$199.99

(\$7.00 shipping)



**Digitable Programmable
100 Channel Scanner**
BC 600XLT covers the following frequencies: 29-54 MHz, 118-174 MHz, 406-512 MHz. Features: compact size of 6-5/16" Wx1-5/8" Hx7-3/8", scan delay, priority, memory backup, channel lockout, bank scanning, key lock, AC/DC power cords, telescopic antenna, mounting bracket supplied, one year factory warranty, search, direct channel access, track tuning, service search including preprogrammed frequencies by pushing a single button for police fire emergency, aircraft, weather, and marine services plus exclusive optional features never available on any scanner before. First is an RF receive amplifier for boosting weak signals for only \$24.99 plus a CTCSS tone board is available for only \$59.99 to make this the number one scanner available in the USA. Optional cigarette lighter plug #600MPC \$4.99.

BEARCAT BC-950XLT

Same features as BC-600XLT but also receives 800-954 MHz. (Excludes cellular)

\$249.99 (\$7.00 shipping)

REGENCY R-4010 \$106.99

(\$7.00 shipping each)

10 channel hand-held scanner. (Same Scanner as Bearcat 55XLT), 29-54 MHz, 136-174 MHz, 406-512 MHz, digital programmable, keyboard lock switch, lockout, includes rubber flex antenna. (Optional accessory 5W-41, only \$19.99 includes rechargeable Ni-Cad batteries, AC adapter/charger and cigarette lighter cord.)



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Heavy-Duty Leather Carry
Case #CC002 \$22.99

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(\$7.00 Shipping)

Programmable, digital, AC/DC operation. Frequency coverage 29-54 MHz, 136-174 MHz, 406-512 MHz. Weather button, priority, lockout button, squelch includes AC adapter, telescopic antenna.

REGENCY R-2066 \$99.99

(\$7.00 shipping)



Digital programmable, 60 channels, AC base scanner, 30-50 MHz, 144-174 MHz, 406-512 MHz. Size 7 1/2" x 3" x 9". Turbo-Scan scans 40 channels per second, 4 channel banks, weather alert, search, priority, lockout, AC cord, telescopic antenna, plus much more.

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what's new?

Larry Miller

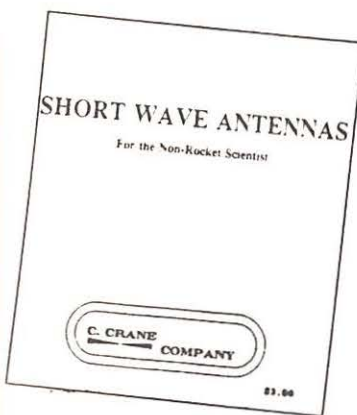
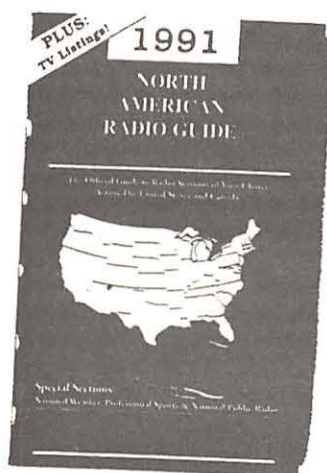
On the Road with Radio

It's summer time and vacation looms on the horizon. So if you're going anywhere in the U.S. and Canada, you may want to pack a copy of the *1991 North American Radio Guide* along with the wife and kids.

Designed to be "The most complete radio guide for travelers," the book lists both U.S. and Canadian AM, FM and TV stations by state and city and includes, in addition to frequency, call letters and station format. It also has a listing of station arranged by format (sports and NPR) and, interestingly, "weather by state" and by highway.

A brief check shows that the listings are reasonably accurate given the 12,000 entries and radio's constant state of flux.

The *1991 North American Radio Guide* is 168 pages long and costs \$7.95 plus \$1.05 shipping and handling from WF Innovations, P.O. Box 93142, Milwaukee, WI 53203.



Antennas for Non-Rocket Scientists

Shortwave Antennas for the Non-Rocket Scientist is an unusual little 13 page booklet. Produced by the C. Crane Company, it seeks to do many things — compare antenna designs (Crane gives the "Firestick" vertical CB Antenna its "top recommendation" for a shortwave antenna), provide a little tutorial on various antenna designs, and sell Firestick CB antennas (\$17.54) and various antenna parts.

Shortwave Antennas is available for a mere \$3.00 from 147 Watson Lane, Fortuna, California 95540.



Ham Radio Database

According to a new product announcement,

a company called j-Com has created a software program incorporating the name, address, license class and year of birth for every one of the 501,906 ham radio operators in the United States.

With "HamBase," you can type in the callsign of your last QSO and, with the click of a key or mouse, get the ham's name and address on a label or QSL card.

The program will also accept a text file list of callsigns as input, producing labels for clubs, hamfests and dealers.

HamBase comes on seventeen 5-1/4" 1.2M diskettes for \$69.95, fourteen 3-1/2" 1.44M diskettes at \$79.95 or twenty-five 800K Macintosh diskettes for \$79.95. For more information, contact j-Com at P.O. Box 194, Ben Lomond, California 95005 or call 408-335-9120 for more information.



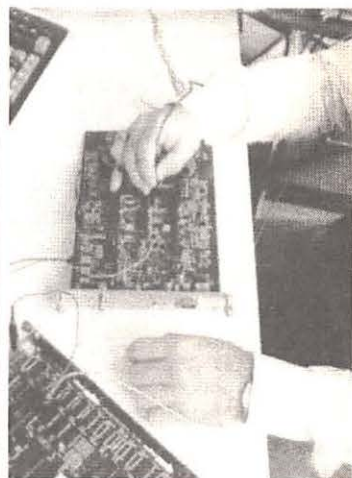
New NRD-535 Software

If you have one of the new Japan Radio NRD-535's and would like to interface it with your computer, there are now programs available for IBM-PC and compatibles.

Although we have not been able to actually test the programs, a product announcement describes the "NRD-535 Memory Management" program as being able to help '535 owners deal with the radio's 200 memories. It can also do band- and memory-scanning among other things. It retails for \$60.00 plus \$2.50 shipping and handling.

The "NRD-535 Event Management" can be used to turn the receiver (and properly attached tape recorder) on and off like a 7- or 14-day VCR. It retails for \$75.00 plus \$2.50

shipping and handling. A fixed disk, 640 KB or memory and a serial port is required to run both software packages. Software is shipped on 5.25 inch diskettes. For more information write to P.O. Box 2275, Vincentown, New Jersey 08088.



Build-It- Yourself

If you're part of the growing number of people who like electronic "build-it-yourself" projects similar to the ones that Doug DeMaw presents each month in *Monitoring Times*, you're going to love *Elektor Electronics USA*.

It's an electronics construction magazine with a difference — all of the projects are not only staff-written but built and tested before publication. In addition, readers get full, technical support, not only through editorial correspondence but by providing all the circuit cards, software and firmware accompanying most of the articles.

Elektor Electronics brings together technologies from around the globe. Licensed from Elektuur, B.V. of Beek, The Netherlands, the U.S. edition is described as "an expansion of the English edition published in Great Britain."

A recent issue included details on how to build a medium power audio amplifier, a digital car engine lock, a 400W lab power supply, a microprocessor Telephone PBX, a UHF TV amplifier and a guitar tuner.

Improve Your Scanning Coverage!

GRE America is proud to introduce a new family of products to enhance your scanning pleasure! First, GRE has designed the new **Super Converter 9001** for base model scanners. The 9001 converts 810 MHz - 950 MHz down to 410 MHz - 550 MHz. The 9001 is the perfect alternative to buying a new, expensive scanner covering the 800 MHz band. Next, GRE announces the new **Super Amplifier 3001** for base model scanners. The 3001 will increase gain by as much as 20 dB, and is engineered to help scanners with low sensitivity pull in weak signals. Both products use BNC connectors, (1) 9 volt battery and have an off/pass switch for returning to normal operation.



Super Converter 9001 & Super Amplifier 3001



Super Converter II



Super Amplifier



All-Band Antenna

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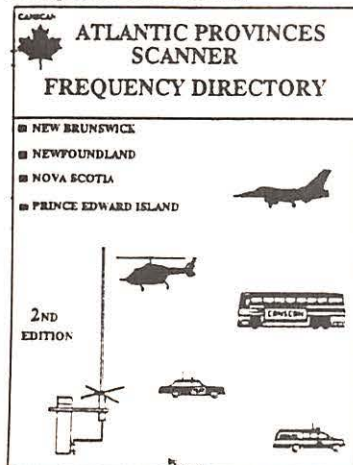
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To get your free issue write Elektor Electronics USA, P.O. Box 876, Peterborough, New Hampshire 03458-9949.



Scanning the Atlantic Provinces

Canadian scanner listeners living in the Atlantic Provinces have good reason to celebrate the release of the second edition of Canscan's *Atlantic Provinces Scanner Frequency Directory*.

Virtually every one of its 150-odd pages is crammed with information on New Brunswick, Newfoundland, Nova Scotia and Prince Edward Island. Listings include police, fire, aircraft, ambulance, forestry, ham radio, government, marine, military and more.

The book is divided into two main sections, a numerical sort of every frequency in the book (in ascending order) and an alphabetical sort by province,

type, description or city and frequency.

The *Atlantic Provinces Scanner Frequency Directory* is a top-notch guide and it's available for \$15.95 plus \$3.00 postage from P.O. Box 3009, Tecumseh Postal Station, Windsor, Ontario N8N 2M3.



Source for Odd Parts

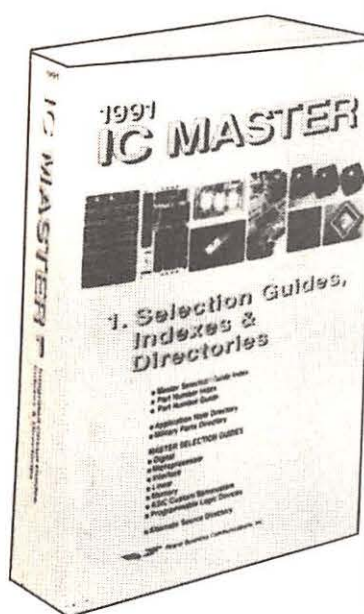
Need a battery for an Elmo or Daewoo camcorder? How about a crystal

for a scanner with a 10.8 MHz IF circuit. Or maybe you find yourself fresh out of SK3893 semiconductors right in the middle of a crucial modification. If so, there is now hope.

Radio Shack now has a Consumer Mail Center that stocks thousands of hard-to-find accessories and replacement parts for consumer electronic products made not only by Radio Shack but by other manufacturers as well.

Inventory highlights include consumer, communications, cordless telephone, camcorder and cellular telephone batteries, the largest selection of receiving "tubes" found anywhere along with a complete line of ICs, transistors, diodes and other solid-state devices not found in the Shack's Consumer Electronics Catalogue.

Items from the Consumer Mail Center can be ordered through any of the 7,000 Radio Shack, Radio Shack Computer Centers, or participating stores nationwide.



IC Master

If C. Crane's *Shortwave Antennas* is for "non-rocket scientists," then the three volume *1991 IC Master* should be able to make the common man quake with fear.

With over 3,400 pages, *IC Master* provides information on 80,000 ICs, bringing together otherwise fragmented product information from virtually every supplier in the industry. This includes 12,000 new ICs, listed by function category and organized in parametric search format.

This year's edition also boasts an expanded military section, IC selection guides for the design engineer and 180,000 pin-for-pin replacement device listings for both current and discontinued parts.

IC Master comes with two free updates during the year. If you mention *Monitoring Times*, you'll also get a copy of the *Designer's Guide to Design Automation*, a \$49.50 value, at no additional charge.

To place your order, send \$160.00 per set (plus sales tax in NY, MA, IL and CA) to Hearst Business Communications, Inc., 645 Stewart Avenue, Garden City, New York 11530. For phone orders call 516-227-1300.



No Code Hamming

Some have said that the "new" no-code ham radio license is amateur radio's best (and perhaps last) chance for a renaissance. Others have compared it to sticking an intravenous needle into the arm of a dead patient. Either way, there were a number of people and organizations ready to help (for a fee) the expected flood of new ham hopefuls.

Now You're Talking is the latest entry in the parade. Published by the American Radio Relay League, that bastion of ham radio, *Talking* is written like a text book.

If you've already decided to go for your license, this is probably one of the best texts you can get. If you're looking for some inspiration, however, forget it. *Now You're Talking* is an exercise in amazement at 1950s era technology.

Take for example the first sentences from chapter one. "How did you first learn about amateur radio?" asks the author. Among other things, the book suggests that you may have seen a funny looking antenna in your neighbor's yard. Or perhaps you received a birthday greeting from an uncle who lives clear across the country. Huh?

Even when mixed with more up-to-date examples of ham radio usage like earthquakes and space shuttles, the approach is truly regrettable, serving to keep ham radio permanently tied to the past.

Note, also, the ARRL's opinion of monitoring, also found on page one: "Unlike shortwave or scanner listening, Amateur Radio doesn't make you sit on the sidelines. When East and West Germany became one country, hams didn't have to learn about it from the TV news: they talked directly to hams in both places!"

Assuming that you can overlook this blatant snub and you did see funny looking antennas or get a kick out of receiving a birthday greeting via amateur radio instead of a real phone call from your uncle, and you still want to get your license, *Now You're Talking* will certainly do the trick.

As a text book it's 100% on the mark. As an inspiration, it is very, very tired. So gee whiz, shortwave and scanner listeners. Stop sitting on the sidelines. Get a copy of *Now You're Talking*. The 300 page book (including 19 pages of advertisements) is \$19.00 at your favorite ham radio store.

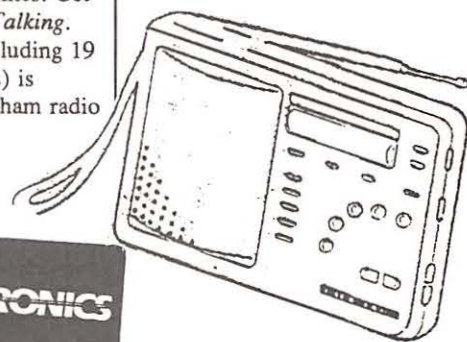


New Optoelectronics Catalogue

One of scanning's most intriguing tools is the frequency counter and Optoelectronics is the hobby's best-known manufacturer of these devices. Interested in a handheld

device that can tell you the frequency of a police officer's walkie talkie? Or the frequency of a particular cellular phone? A frequency counter may be for you. Optoelectronics's new catalogue is free of charge and contains product descriptions and technical data as well as helpful tips on how to use frequency-finding handi-counters, universal counter-timers for lab and field, PC-based counters with Windows 3.0 for control and display, active preselector bandpass filters and antennas and accessories.

To get your copy of the catalogue write Optoelectronics, 5821 NE 14th Avenue, Fort Lauderdale, Florida 33334.



World Perspectives from Shortwave

World Perspectives has now opened an electronic conference on the international PeaceNet computer network. *WP* is a monthly magazine published by the non-profit People's News Service that features alternative news, views and analysis taken primarily from international shortwave broadcasts.

Subscriptions to *World Perspectives* are \$19.00 from P.O. Box 3074, Madison, Wisconsin 53704. Sample copies are \$2.00. PeaceNet can be reached at 18 De Boom St., San Francisco, California 94107.

Sound Detector

Last year there was quite a stir in legal circles about a snooping device widely advertised as the "Whisper 2000." It was finally taken off the market. But audio amplification is a simple technology and there are many articles on the market that can be used for a variety of sound amplification purposes.

One of these, the "Super Electronic Sound Detector" (\$69.96 from Chemical Light and Electronics Company, 2203 Florinda St., Sarasota, FL 34231; ph. 813-922-2633), comes with headphones, audio adaptor, contact mike and a caveat against eavesdropping on your neighbors.

The vendor points out that although you may have a bit of detective in you, the device can be used for more than listening to voices through the walls; you can hear faulty valves,

noisy bearings, leaky toilets, running water and even mice and insects through glass, wood, plaster, brick or 12 inches of concrete!

Custom made in the United States, the portable snoop comes complete with 9 volt battery and instructions.



Review

Optoelectronics VHF/UHF Bandpass Filter

With all the accessories on the market for monitoring frequencies and services above 30 MHz, no one until now has produced a tunable preselector which prevents off-frequency overload from degrading the signal of interest.

But maybe there's still an opportunity for entrepreneurs--this entry costs nearly \$1000, making it of limited interest to recreational scanning enthusiasts, but of extraordinary interest to the serious professionals who must monitor specific frequencies without fear of intermod or image interference from strong, nearby signals.

The new Optoelectronics APS-204 receiver bandpass filter may be tuned anywhere between 20 and 1000 MHz; a multiturn counting potentiometer provides rough indication of center frequency.

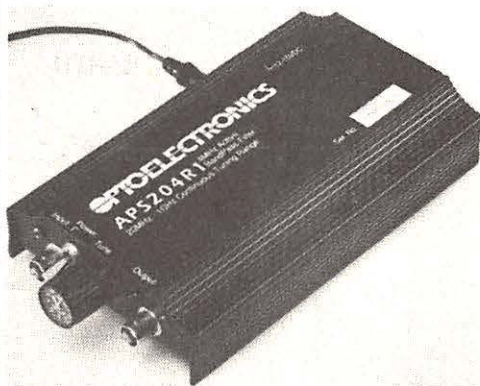
With no insertion loss (0 dB gain), the filter provides a sharp peak wherever it is tuned, far sharper than a conventional inductance/capacitance (LC) tuned filter. Third order intercept is specified at 15 dB (typical). Noise figure is about 10 dB, allowable in the strong signal environment for which the APS-204 is intended.

The secret is a custom 4-megahertz-wide resonant cavity, tuned in a double-heterodyne fashion by a precision Z-Comm voltage controlled oscillator (VCO). The incoming signal is mixed with the LO, then the resultant IF is mixed again with the same LO to reconstruct

the original frequency, so it's drift-free. The designer is presently seeking patent protection on the technique.

Housed in a rugged, extruded aluminum case, the filter consumes about 6 watts of power at 12 VDC. No bypass provision is present so the unit must be disconnected from the line when not in use. The control cluster is not expected in its intended application.

APS-204 tunable filter, \$995 from Optoelectronic Inc., 5821 NE 14th Avenue, Ft. Lauderdale, FL 33334; ph. 800-327-5912.



PC SWL \$99.00

A Complete Digital Reception System

PC SWL contains the hardware, software, instructions and frequency lists needed to allow you to receive a vast variety of digital broadcasts transmitted over shortwave radio. All you need is any IBM PC or compatible computer and an SSB shortwave receiver. The product consists of:

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World Press Frequency List
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PC SWL software uses the processor in your PC to do the work, why pay for another expensive box when a simple interface and your PC and do the job?

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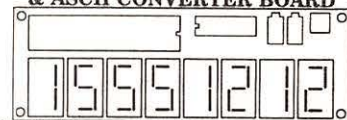
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I consider Monitoring Times best value for the money of all current SWL publications!

--1991 Reader's Survey comment

The Puzzle of Propagation

I have a confession to make. As editor of the beginner's corner no topic should go uncovered; no question raised should go unanswered; no issue should remain unexamined, right?

Well, Old Uncle Skip is here to tell you that, over the years, there has been one topic that I have actually avoided writing about. One subject I have consistently failed to broach in a beginner's column: PROPAGATION.

Why have I so studiously avoided giving out my pearls of wisdom on this all important subject? Mainly because I have always felt that it was too complicated. My goal here is to get newcomers to listen to their receivers, not run away and take up knitting because things are just too technical to be enjoyable.

Propagation can confuse most entry level users. So, accepting the basic premise that there is no problem in this world so vast that it could not be run away from, I have avoided talking about propagation.

Uh, enough with the true confessions, Uncle Skip!

Okay, Boss. Anyway, since the pile of mail asking about this subject has completely covered my desktop, I suppose I should have a go at telling everyone just what this propagation stuff is all about. With that, I give you...

UNCLE SKIP'S PROPAGATION BASICS

Did you ever wonder how this whole radio thing really works? Somebody way off in Freedonia sends out a signal that somehow gets all the way to your little box on your table top. Furthermore, how come that guy in Freedonia can't just set his transmitter up on the same frequencies as your local AM station? And while we are at it, how come you can only hear Radio Freedonia during certain hours, on certain days, in certain seasons, even though the guy transmits 24 hours a day 365 days a year?

The answer can be summed up in one word...PROPAGATION! Propagation is the science (and witchcraft) of how radio waves travel between two points, often in spite of the world around them.

The reason your local AM "All Elvis All the Time" station comes in loud and clear is because you are receiving its signals via GROUNDWAVE. Essentially, this means that the station sends its signals out toward the horizon. Your happy home is in the path of these signals as they march toward the horizon. The signal just sort of bowls your receiver over. No muss, no fuss, no bother.

Back to Radio Freedonia. Freedonia is way over on the other side of the planet from you. You are no longer directly in the radio wave's march toward the horizon. Since it is essential to the continued political stability of Freedonia that its broadcast be heard in the US of A, Radio Free Freedonia broadcasts in the shortwave frequency range. This allows for SKYWAVE PROPAGATION. Freedonia's signals travel past its horizon line, bounce off the IONOSPHERE and head back down toward earth and your receiver over on the other side of the globe.

If you have ever played pool you might think of this as a "bank shot". Sometimes the signal even bounces back to earth and heads back up to bounce off the ionosphere again. This puts the signal even further away from its transmitter location.

The formal name for this bouncing is REFRACTION but you will hear people call it other things such as SKIP or PATH or plain old BOUNCE. See why things can get complicated?

To use the pool table analogy again, the angle that the radio signal hits the ionosphere directly effects where the signal will come down and be most clearly heard. So you think this would make it real easy for the stations. All they would have to do is set up antennas that would give them just the right "bank shot" to get the signal where they want it to go.

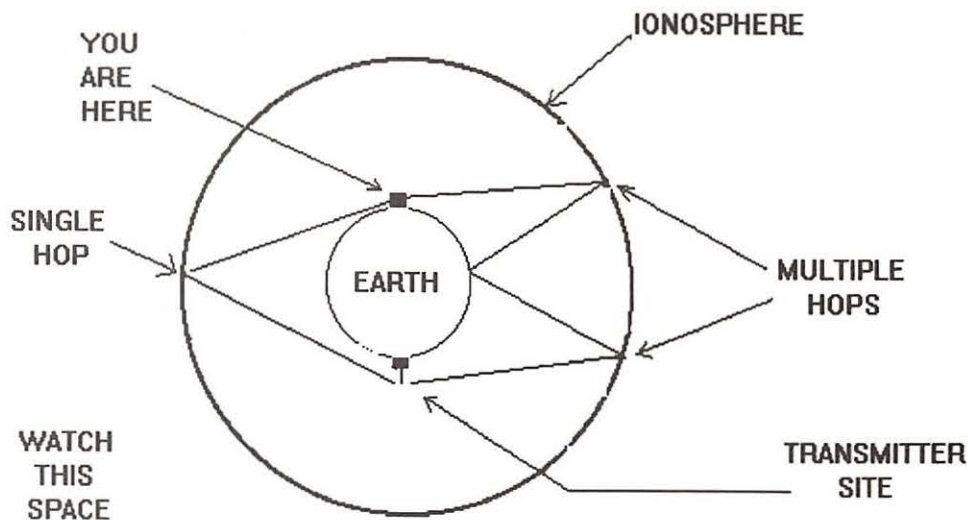
To a certain degree, this is done. However, the ionosphere changes the rules of the game by changing the height at which the signal will refract back down to earth. Imagine lining up a perfect pool shot only to have someone move the bumper back a foot right after you hit the cue ball! Consequently, the science of predicting how the ionosphere is going to react becomes important to both the transmitter and receiver.

Just What is the Ionosphere Anyway?

The earth is surrounded by a big ball of gases. This gas ball extends up more than 1200 kilometers (although I would not want to try breathing up that high). The area that ranges between 60 and 1200 kilometers (km) is generally considered the ionosphere.

What happens is that the gases between these altitudes become "ionized" by the ULTRAVIOLET RADIATION from the sun. The more radiation the more ionization occurs. So it is easy to see that the ionosphere will be more densely ionized over the part of the world that is exposed to sunlight at any given time.

Now comes the tricky part. If the ionosphere is very dense, too much of the transmitted signal will be absorbed and not enough signal will get back to earth to be heard acceptably. On the other



AN EXTREMELY SIMPLE PICTURE OF HOW PROPOGATION WORKS

hand, if the ionization is not dense enough, the transmitted signal will not refract as desired, instead it would head off into space.

Toss in the fact that the altitude at which refraction occurs also varies with ionization density and you can see why the science of propagation may seem about as accurate as tabloid newspaper astrology.

With almost a century of both professional and amateur propagation prediction under our belts, certain discoveries have allowed radio people to make good predictions about when and where to listen to hear just about anything they want to hear.

The Cosmic Layer Cake

Over the years we have come to know patterns of ionospheric density that give us a clearer understanding of propagation. You can imagine these patterns as layers. The layer closest to earth would be "A" and as we move out from the earth we would encounter "B", "C", "D", etc. For our purposes we don't even have to sweat A through C. The radio person's worries start at layer "D" and go up through layer "F".

"D" Region

If you wonder why you can only hear your favorite shortwave broadcasters in the evening and not at high noon you can blame the D layer. This region is usually between 50 and 100 km above the earth. Its ionization is very low at night, but it becomes very densely ionized during daylight. So dense, in fact, that it absorbs any signals below 7000 kHz, effectively blocking most long distance shortwave communication.

Remember how I said this ionization process was related to the sun? Whenever there occurs a period of intense solar activity in the form of solar flares, the D layer can become so highly ionized that it can blank out all radio frequencies leaving only local groundwave communication possible. So the best time to listen for your favorite SW broadcaster is during the hours when both you and that station are in relative darkness, thereby minimizing the negative effects of D layer absorption. Shine a flashlight on a world globe and you can get an idea of how this might work.

"E" Region

The E layer runs between 100 and 160 km and is responsible for most radio wave reflection. What makes this layer interesting is that it becomes effectively weaker at night. Practically you can think of it rising up to meet the F region.

So if the E layer refracts radio signals at 100 km high during daylight and this layer rises as the night goes on to about 160 km, the angle that

a signal will hit the refractive layer will change greatly. Too steep of an angle and the signal travels up and is absorbed or maybe even punches through into space. The lower the angle of refraction, the greater distance the signal can travel.

This layer's actual height changes with the season and with solar activity. This is why many shortwave stations will make frequency changes usually on the first Sundays of March, May, September and November.

One curiosity about the E layer is that, although it effectively rises to meet the F layer at night, areas of the E layer can still remain low enough and dense enough to affect communication creating an effect known as SPORADIC E SKIP. These clouds of ionized particles can allow for unusual long distance reception of FM and TV signals usually from May through July in the United States.

"F" Region

Out there between 160 and 320 km, the F layer represents the last layer of the ionosphere that can normally refract shortwave signals. Actually I should say "layers," because during daylight hours this layer splits into two distinctive layers at around 200 km. These are referred to by propagation pundits as F1 and F2.

So what does this mean practically? Think of it this way. After the sun goes down, the D layer no longer blocks long range communication, and the E layer rises to meet the F1 and F2 layers that have combined into a single F layer around 250 km above the earth. This overall process is predictable enough to allow stations to plan frequency and antenna patterns to create maximum effective communication over desired distances.

The plus for the DXer is that variations in refraction angles and multiple hop signals can allow you to hear stations at distances greater than their intended target audiences.

By monitoring regular seasonal variables and patterns of solar activity a dedicated DXer can even go hunting for stations he or she is not supposed to be able to hear under normal conditions.

Knowing your LUF from your MUF

When I first started to monitor shortwave, I certainly didn't feel like spending many hours researching propagation patterns that could be better spent twisting the dials and hearing stations. You're probably feeling the same way. To be honest, the real advantages of in-depth propagation analysis will only bear fruit as you move into more specialized listening habits.

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As a beginner or even an intermediate level SWL, you have everything you need to know about propagation right in your hot little hands. *Monitoring Times* has done all the donkey work for you! Turn with me now to the SHORTWAVE GUIDE section of *MT*. Read the directions provided at the top of the page carefully. As you can see by looking at the graphs provided, not every part of the world can be heard best simultaneously. You use the propagation charts to target your listening.

Each chart shows you the MAXIMUM USABLE FREQUENCY (MUF) and the LOWEST USABLE FREQUENCY (LUF). What this means is that, given all the conditions affecting all of the layers of the ionosphere, at any particular time, any frequency above a certain level (MUF) will pass through the refractive layers into space. Also any frequency below a certain level (LUF) will be absorbed by the ionosphere and not return to earth.

Between these two figures is a window of frequencies you can use to hunt stations in a given area. As a rule, the closer a station transmits to the MUF the better its received signal strength will be. This is because the signal is less likely to be affected by the absorptive properties of the D and E layer.

As you can see by looking at the propagation charts, you would be wise to pick a listening time that allows for the widest window of frequencies. You will find that the charts in *MT* will meet most of your listening needs.

Isn't there more to it?

You can bet your paycheck on that, Bunkey! We haven't even taken a look at tracking sunspot cycles and half a dozen other factors that can affect your listening. But don't get too bent out of shape. You have the rest of your life to doodle around with propagation. There are dozens of books to absorb and theories to experiment with.

Relax! *MT* has taken the worry out of effective listening. And by the way, don't be too surprised if you hear something even when the charts tell you you can't. Propagation is far from an exact science. Have fun!



Radio Spies

Last month we took a look at super secret National Security Agency and its headquarters in Maryland. The NSA is in the business of eavesdropping on the communications of the world. It does so with its own listening posts and by enlisting the services of other agencies such as the U.S. Air Force, Navy and the CIA.

The main targets of the NSA are the communications and radar signals of the Soviet Union, but recently the NSA has turned its big electronic ears towards the middle east. Much of the credit to the swift success of Desert Storm is due to the information provided to the armed forces by the NSA.

This month let's "spy" on how the NSA gathers its ELINT (Electronic Intelligence) through some of its exotic listening platforms.

An NSA listening post can come in many forms. It can be a huge complex with hundreds of employees using state-of-the-art radio and computer technology, or it can be a solitary spy equipped with a communications receiver placed in a targeted country.

A listening post doesn't have to be stationary. There are mobile listening posts consisting of radio equipment packed into vans, flying ELINT aircraft such as Rivet Joint and Cobra Ball and spies in outerspace such as the KH-11 Keyhole satellites.

On Land

One of the most important land based listening posts is the Wullenweber facility in Edzel, Scotland. Sprawled across the lush green Scottish countryside is the mammoth Wullenweber antenna array. Looking for the world like a metal high tech Stonehenge or as the locals describe it,

a series of elephant cages, the antenna system is designed to receive everything from ELF submarine communications to UHF military transmissions.

Coordinating with other NSA listening posts such as the one at Vint Hill, Virginia, and Two Rock Ranch, San Francisco, and by using sophisticated direction finding triangulation techniques, the NSA can discover exactly where intercepted communications originate.

By Sea

In the 50's and 60's the NSA had a large ocean going fleet of eavesdropping ships. Copying the Soviets, the NSA outfitted trawlers with sophisticated listening gear and sent them trolling for signals along the coasts of the world.

Two famous incidents basically sank the idea of using ships for radio spying. In 1967 during the Israeli-Egyptian War the NSA ship *Liberty* was "accidentally" attacked by Israeli jets and torpedo boats. To this day many American intelligence sources say that the *Liberty* was deliberately attacked to keep the U.S. in the dark as to how well the war was progressing for Israel.

Then in 1968 the eavesdropping ship *Pueblo* was captured by the North Koreans; thereafter, all clandestine eavesdropping by sea was essentially dropped. To fill the gap, the U.S. Navy does the ocean-going eavesdropping for all U.S. intelligence agencies.

By Air

Jammed-packed with every piece of listening equipment that it can carry, the RC-135 ELINT

"Ferret" aircraft do the airborne eavesdropping for the NSA.

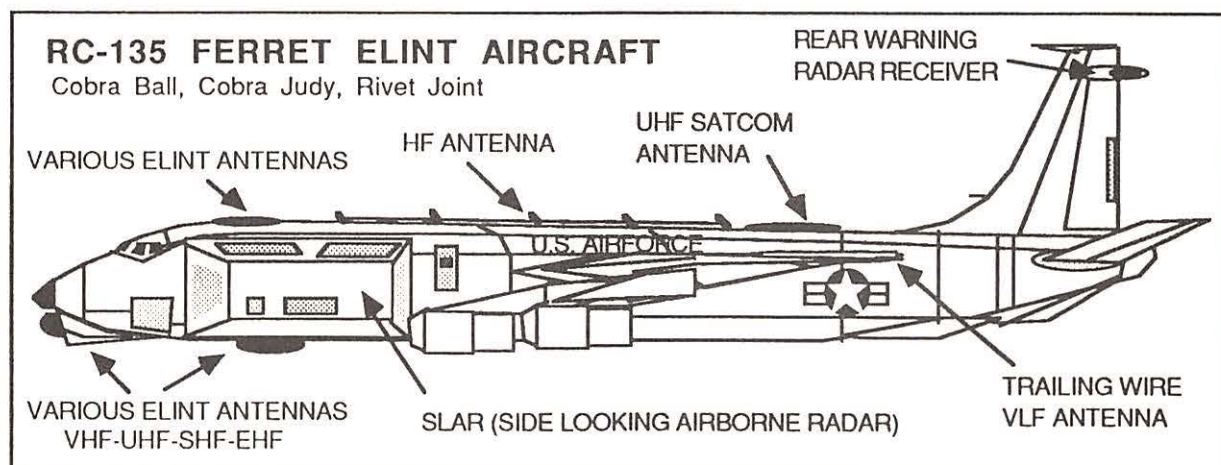
Known by various code names such as Cobra Ball, Cobra Judy or Rivet Joint, the missions flown in these converted KC-135 tankers are some of the most dangerous in the Air Force. The RC-135s intentionally violate Soviet airspace hoping that the armed forces of the Soviet Union will come alive, scramble and come up to chase them out.

The mission is to test the Soviet's response, log and pattern all radar transmissions, record all communications and then get back into international airspace without getting caught. The pilots who fly these missions call it "Tickling the Bear's Tail" or if it is a mission to China, "Tickling the Dragon's Tail." These slow, unarmed flying eavesdropping platforms also record the data from Soviet missile tests and the Soviet space program.

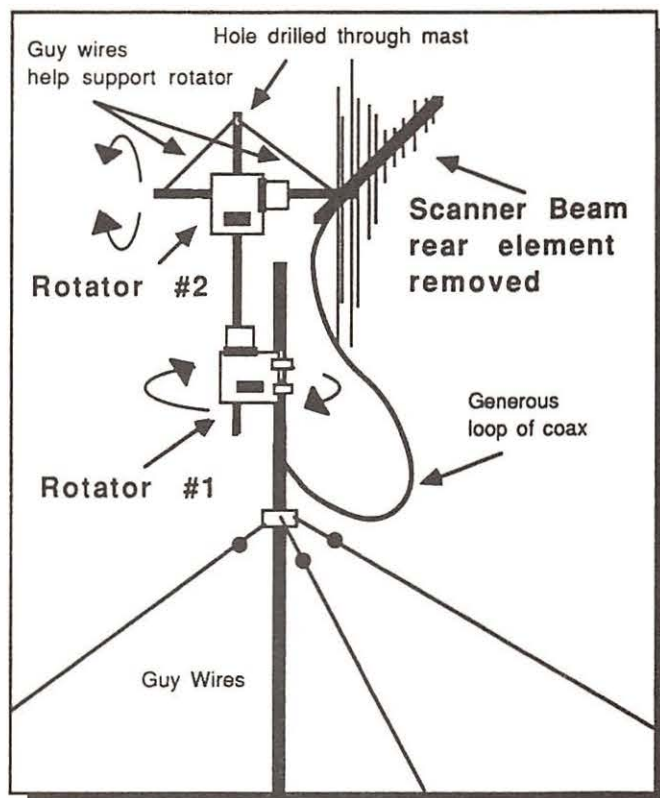
When the Soviets scrambled and shot down the ill-fated Korean Airliner flight 007, it was a Cobra Ball ELINT flight the Soviets thought they had caught. Unfortunately, there was a Cobra Ball flight in the area a few hours earlier which might have led up to the tragedy.

All RC-135 Ferret platforms are based at Offutt AFB, Omaha, Nebraska, but are usually deployed wherever they are close to the targeted country. Many of them are based at Shemya, and Elmendorf, Alaska.

Recently some were rushed to the Middle East to take part in Desert Storm. One of their missions was to listen to all Iraqi communications hoping that some tale-tale transmission would give away the whereabouts of Saddam Hussein.



Monitoring Times Graphic



Next month we will look at one more of the NSA's toys, those super spy satellites in the sky, Big Bird and Keyhole.

Mailbag

Fleck Wilkin from Bermuda writes that he has tried and tried to monitor the military satcoms but is not having any luck. He says that he is using a Realistic Pro 2005, a Grove preamp, and a Grove Scanner Beam but is not having any success. "Could you please give me any information you can on monitoring the military satellites?" Brent asks.

Well, Brent, it seems that you have the right equipment. You might think of modifying a bit. I have basically the same setup but have added a few twists that really improve the reception and help capture those elusive and weak satcom signals.

First of all remember that most AFSATCOM and FLTSATCOM communications are either narrow band FM or wide band FM. If your 2005 is not set in these modes, you will miss out.

As for your antenna, the Grove antenna is great for picking up military sats. I increased the efficiency of mine on the UHF bands by sawing off the large rear antenna element. Do not do this if you want to listen in on the VHF low bands (30-50 MHz) because it basically eliminates the reception on that band, but it does improve it considerably on UHF.

I also use two antenna rotators on mine. Why two, you might wonder? I use one to rotate the

antenna through the compass points and one to aim it at the right declination and ascension in the sky (See diagram).

In that way I can point it right at a military satellite to really capture those weak signals. It takes some time and patience to figure out just where the military satellites are hanging in the sky but with a little work it can be done.

Gene Hughes, editor of the famous *Police Call* scanner directories, wrote to comment on the Federal File's article on electronic bugging. Gene theorizes that the best place to look for eavesdropping devices on the radio bands is between 406 MHz and 420 MHz.

Gene goes on to state, "Let's look at it from a logical viewpoint. Consider: the power is very low (body and room bugs) so the receiver must be extra sensitive. Ambient noise should be at a minimum: low-band is noisy. Transmission characteristics on low bands are poor inside structures, plus the antenna would be very inefficient. I would eliminate low-band, because of the need for receiver sensitivity.

"The bugging frequency and adjacent frequencies must be clear of interference. Intermod could also be a problem. This eliminates the TV band, FM broadcast and non-Federal frequencies.

"The higher the frequency, the more efficient the transmitter antenna will be (because of the length) and the better it will perform inside structures. Even here in Los Angeles, intermod is at a minimum in the 406-420 MHz band."

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Gene goes on to say, "My guess is that the feds would use 406-420 MHz or even a spot in the 236-406 MHz band. I would also guess that they would use a 12.5Kc split in 406-420. High band would be my second choice."

Thanks Gene, that will give us all something to ponder as we search the bands in our bug hunt.



More WARC-MOB-87 frequency changes

This month marks the implementation of the new frequency plan which was decided upon at the 1987 Maritime Mobile World Administrative Radio Conference. I was recently asked what the intent is behind all these changes.

The short answer to this big question is that the changes will bring more frequencies into use in order to satisfy the needs of the Global Maritime Distress and Safety System (GMDSS). In the next High Seas I will try to provide a more detailed explanation of the reasoning behind the most drastic alteration of maritime frequencies since the introduction of single sideband.

In May we looked at the changes which are taking place at some selected stations, and this month we are going to carry on with a few more.

Portishead Radio

British Telecom have announced that there will be no changes to the Morse code (CW) frequencies used at Portishead Radio. All of their upper sideband and radiotelex frequencies will be changing as listed below.

Radiotelephone (RTTY)

Old	New	Call sign
4350.5	4211.0	GKE 2
4353.0	4213.5	GKL 2
4353.5	4214.0	GKP 2
4356.0	4216.0	GKY 2
4356.5	4216.5	GKQ 2
6495.0	6315.0	GKE 3
6500.0	6316.5	GKP 3
6502.0	6321.5	GKL 3
6505.0	6324.0	GKQ 3
8705.5	8417.0	GKE 4
8711.0	8422.5	GKP 4
8714.0	8425.5	GKY 4
8714.5	8426.0	GKL 4
8718.0	8429.5	GKQ 4
13072.0	12580.0	GKE 5
13083.5	12591.5	GKL 5
13085.0	12593.0	GKP 5
13095.0	12603.0	GKY 5
13099.0	12607.0	GKQ 5
17198.0	16807.5	GKE 6
17211.5	16820.5	GKL 6
17215.0	16824.0	GKP 6
17218.0	16827.0	GKY 6
17231.0	16840.0	GKQ 6
22562.0	22377.0	GKE 7
22578.0	22393.0	GKP 7
22582.0	22397.0	GKL 7
22590.0	22405.0	GKY 7
22594.0	22409.0	GKQ 7

Upper sideband

4360.5	4360.0	GKT 22
4372.9	4372.0	GKT 26

4385.3	4384.0	GKT 20
4434.9	4432.0	GKV 26
8722.0	8722.0	GKT 42(no change)
8765.4	8764.0	GKU 46
8774.7	8773.0	GKU 49
8784.0	8782.0	GKV 42
8796.4	8794.0	GKV 46
8811.9	8809.0	GKW41
13100.8	13077.0	GKT 51
13103.9	13080.0	GKT 52
13116.3	13092.0	GKT 56
13172.1	13146.0	GKV 54
13184.5	13158.0	GKV 58
13190.7	13164.0	GKV 50
13196.9	13170.0	GKW 52
17236.0	17245.0	GKT 62
17248.4	17527.0	GKT 66
17263.9	17263.9	GKU 61
17276.3	17284.0	GKU 65
17285.6	17293.0	GKU 68
17301.1	17308.0	GKV 63
17329.0	17355.0	GKW 62
17344.5	17350.0	GKW 67
17353.8	17359.0	GKW 60
	19755.0	GKT 18
	19761.0	GKU 18
22615.0	22711.0	GKT 76
22630.1	22729.0	GKU 72
22636.3	22735.0	GKU 74
22654.9	22753.0	GKU 70
22676.6	22774.0	GKV 77
22682.8	22780.0	GKV 79
22716.9	22813.0	GKX 7
	26148.0	GKU 25

While no frequencies have been dropped by Portishead Radio, it is interesting to see three new frequencies introduced, two at 18 MHz and the other at 26 MHz.

Mobile Marine Radio

WLO is also changing their frequencies. At the time I received this information from the station, the new frequencies in the 18 and 26 MHz and 22 MHz CW bands were not yet finalized. However, I will include these in a future column when they become available..

Radioteletype (RTTY)

4212.5	4257.5
4213.0	4343.0
4215.0	4462.5
4217.0	6344.0
6317.0	6416.0
6319.0	6446.5
6321.0	8445.5
6323.0	8473.5
6325.5	8514.0
8418.5	8534.0
8419.0	8658.0
8421.0	12660.0
8421.5	12704.5
8423.5	12886.5
8429.0	12992.0
12581.5	13024.9
12586.5	16968.5
12591.5	16997.6
12593.5	17021.6
12596.0	17172.4
12599.0	
12604.0	
12604.5	
12606.0	
16809.0	
16812.0	
16814.0	
16818.5	
16820.5	
16826.0	
16828.0	
16831.0	
16833.0	
16836.5	
22381.0	
22383.5	
22403.0	
22404.0	
22406.0	
22407.0	

Morse Code (CW)

Upper Sideband

4369.0
4396.0
4411.0
8788.0
8803.0
8806.0
13110.0
13149.0
13152.0
17260.0
17335.0
17362.0
22774.0
22786.0
22804.0

Update on Passenger Ships

Carnival Cruise Lines have announced their plan to purchase Premiere Cruise Lines. By July this sale should be complete and Premiere will be under Carnival management; however, this will not likely result in any changes.

As is the case with Holland America Line, which Carnival also owns, Premiere will continue to operate as a separate company. Currently Premiere owns three ships:

Name	Length	Gross tonnage	Passengers
Atlantic	671 feet	36,500	1,600
Majestic	545 feet	17,750	950
Oceanic	782 feet	40,000	1,188

These ships are based at Port Canaveral and sail three and four day cruises to the Bahamas. Premiere Cruise Line is the official cruise line of Walt Disney World and a major seller of family cruises.

VHF and 2 MHz frequencies will be the best place to attempt to hear these ships.

A new ship, the Ecstasy, has entered service on the Carnival Line, and a contract has just been signed to build her sister, the Sensation.

Holland America is expecting the delivery of the first of three new ships, the Statendam, during 1992, with the other two to follow in 1993 and 1994.



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SCORPIO

ID(Sta): GKY6 (PORTISHEAD RADIO) Location: England
Date: 02-27-91 Begin Prg: 03:17:35 End Prg: Freq: 17.220.00
Mode: FSK Signal Agg/Svc: Coastal (sea) QSL:
Remarks: SITOR traffic -<arq>-
Data: 23 / / / 17.220.00 FSK / Signal() #2082
[Radio] [PSE] [CLS] Terminal Mode [CHG] [CLD] [S/F] [Qw/eX]
-LogScan- Log of John Doe [TJ]

CHD: AL
MODE NOW ALIST
.. THIS IS AN AUTO TELEX MESSAGE SYSTEM
TRAFFIC FOR THE FOLLOWING VESSELS:
USS FREDRICKS
HMS UINC...

GA *?

<arq FILE LOADED>

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We're Something Special

The darkest hour is often just before the dawn. Spring had come to Centenary College in Hackettstown, N.J. back in 1988. Final exams were being completed. Classrooms became silent and dark, and their radio station, WNTI, also went on vacation. On the air since the late fifties, they were only on the air during the school year with a sporadic and unpredictable schedule.

Students eventually returned after a long summer, but WNTI did not. Their general manager had left to pursue other interests. Without leadership or direction, the station ceased to exist and the transmitter remained cold.

The stars and planets must have been in rare alignment when the college found Fred Bifulco. He was the right mixture to complete a winning recipe for radio. A seasoned professional in broadcasting, Fred began his career as an award winning student at Ithaca College in upstate New York. After graduation, his experience grew at New York City's WHN and Wings 105 FM upstate in Watkins Glen.

Bifulco advanced and became the afternoon drive personality at WRAN, Randolph, N.J. for almost two years. WRAN in Hackettstown quickly hired him when WRAN was sold and reorganized. A year later, Centenary College sent out an S.O.S. to save their station and Fred rose to the call.

Many mountains had to be scaled before WNTI could begin a reincarnation. An all volunteer staff was recruited and reorganized. Students from Centenary's fine arts department, along with people from the Hackettstown community, took basic broadcast training and refresher courses.

Fred discovered an engineering firm, Sage Communications, to get the studio and transmitting facilities in order. The Associated Press news wire was reactivated. Local newspapers were alerted and ran stories about the new renaissance.

On Halloween day 1988, WNTI returned to the air with an ambitious staff, and the energy continues to this day. Now Fred's goal is to produce a 24-hour a day broadcast schedule, every day of the year. "You have to broadcast year-round in order to build any kind of credibility."

A full-time operation would also protect the station from challenges by other schools asking to share their valuable frequency or take it over altogether. "Your license should be put to good use," Fred realized, and did just that.



General Manager Fred Bifulco and DJ Elisa Padilla help provide commercial radio station quality at WNTI

WNTI has become a welcome addition to the college, the people of Hackettstown, and far beyond. With 5600 watts of power, and an excellent transmitter site in nearby Independence Township, the station is heard on 91.9 MHz covering areas over 60 miles away. Northern New Jersey, eastern Pennsylvania, southern New York, and New York City all tune in to WNTI.

A wonderful collection of creative staff members have molded WNTI into something much more than just another college rock 'n' roll station. Bifulco devised a precise format for the hours rock is aired emulating a typical broadcast station. No better training could be provided for the aspiring broadcaster. Students follow all the elements of a format clock including four song slots an hour for the disk jockeys to program themselves. This time allows them to add a personal feel to their shows and to play phone requests.

News casts are written and presented, along with weather, a community calendar of events, and a job opportunity billboard adding to their tight sound. The result is as professional as a commercial radio station.

Weekends and weeknights WNTI's eclectic mix of rock and other popular music is set aside to make way for an amazing compendium of shows presenting classical, jazz, inspirational, blues, big band, reggae, Caribbean, doo-wop, R&B, and even heavy metal and rap music. The combination of personalities and styles turn WNTI into an ongoing educational adventure in American music. The classroom is as close as your radio.

The studio also serves as a classroom for everyone who frequents it. WNTI is a training ground for two of the college's courses: media

newswriting and an introduction to studio operations taught by Fred himself. In addition, anyone from the community can apply and be trained to go on the air without charge.

Elisa Padilla, a WNTI on-air personality, loved the feeling of welcome she received when she approached the station. "I tried to work at other stations, but you had to try out and it was very competitive. WNTI accepted me right away and taught me how to operate everything."

A senior at Centenary, Elisa used her experience to start her career. She is interning at the MSG Cable Network this summer. Other WNTI staffers have also been placed at a variety of local radio stations, and at Shadow Traffic, a reporting service used by nearly every station in the New York Metropolitan area.

The future is looking increasingly bright at Centenary College Radio. The school is building a sports program, highlighted by a men's and women's varsity basketball team. WNTI responded with exclusive coverage of their games, produced by WNTI sports director Kristene Anderson. The Centenary College commencement ceremonies are also now heard on WNTI. The College Music Journal, a nationwide publication following new trends, has recently added the station as one of their monitors, and local businesses and residents are increasing their support daily.

Only a few air slots remain available for newcomers at WNTI. Fred's dream of a unique full-time station, with lots of personality, is rapidly coming true. He recently received a call and a resume from a fellow who is eager to do the dreaded 3 a.m. to 6 a.m. shift nightly. Why does he want to broadcast on WNTI? Fred Bifulco is turning "Northwest New Jersey's best kept secret" into something special.

Be an American BandScan Reporter.

See any stories about radio in the local paper? Send them to Monitoring Times, PO Box 98, Brasstown, NC 28902.

Bits 'n' Pieces

Look up in the sky. It's a bird. It's a plane. Maybe it's King Kong. Hundreds of telephone calls poured into police stations in Manhattan recently reporting several men hanging from the top of the Empire State Building, a landmark of New York City. Many theories were presented about what they were up to. Was it a man attempting suicide being held back by friends? A thrill seeker looking for attention? Imaginations ran wild.

The answer was simple. It was a very clear day with low winds, and a perfect time to maintain the multiplex antenna farm used by most of New York's FM broadcasters. Fearless riggers and engineers climbed the tower, reaching up almost 1500 feet, with a variety of equipment, to ensure continued operation of this important installation. They became quite a conversation piece, as they were seen by thousands of pedestrians pointing upward. Later, almost every local TV newscast showed footage of the event.

Few things are certain in the world of broadcasting, but KGO radio in San Francisco is certainly consistent. Newstalk AM 810 may have achieved an all-time record by being number one in ratings for 50 Arbitron surveys in a row. For more than 12 years, since the summer of 1978, KGO has been listened to by more people in the Bay area than any other station.

Happy birthday to FM stereo. The FCC adopted an FM stereo transmission system derived from proposals presented by General Electric and Zenith 30 years ago in 1961. Three stations immediately started stereophonic broadcasting: WGFM, Schenectady, N.Y., owned and operated by General Electric; Zenith's noncommercial WEFM in Chicago; and KMLA Los Angeles. The GE/Zenith system has been accepted as a worldwide standard.

Mailbag

One hundred years from now, in the year 2091, WCRB-FM in Boston will still be a classical music radio station. The current owner, 80-year-old Ted Jones, bought the station in 1948, and has announced that he has invested his entire stock portfolio into a trust to assure no change in WCRB's format for the next century. He has also insisted that the station shall not be sold or altered in any way.

"Money is not the issue," Jones commented at a press conference. "That's secondary to doing something worthwhile. Knowing that KCRB will continue to exist as long as there is a viable market for it makes me feel that I'll be leaving something future generations will value." Bravo, Ted. MT reader Malcolm Kaufman tuned us in to this event.

New Station Grants

Here are the latest stations soon to appear on a radio near you. Colorado City, AZ

107.1; Victorville, CA 88.5; Darien, GA 107.7; Monroe, LA 90.3; Tioga, LA 680; Olive Branch, MS 95.7; Savannah, MO 92.7; Bixby, OK 105.3; Hallettsville, TX 99.9; McAllen, TX 88.1; Pearsall, TX 94.1; Fisher, WV 103.7; Plymouth, WI 104.5. Courtesy of The M Street Journal.

For Sale

Many readers have commented that the stations listed in "For sale" are expensive beyond consideration. If you search diligently for the right opportunity, small starter stations should be within your reach. Several stations have passed hands at affordable prices recently, and here are some examples: WOKJ on 1550 kHz in Jackson, Miss., was sold for \$35,000. It operates with 50,000 watts during the day and 10,000 watts at night.

Three people pooled their funds to buy KBRN in Boerne, Texas. The 250 watt daytimer sold for \$30,000. Idaho Heartland Broadcasting, a consortium of five individuals, purchased KZID in McCall, Idaho, a full-time station on 1240 kHz for \$10,000.

A station is usually worth roughly twice its annual gross income. If the operation sells \$60,000 a year in advertising, a fair price should be about \$120,000, unless it is an exceptional property ensuring significant growth in the near future. Stations that are off the air and dark can be a good place to look for bargain prices.

Consider your competition. Are there many

stations already operating in the area, and do local newspapers and television stations absorb your potential advertising income? What has the track record of the station been in the past? Caveat emptor, and best of luck in your search.

International Bandscan

The war is over, and Radio Kuwait is back on the air, with local service to Kuwait City on 87.9 and 92.5 MHz FM and 540 and 1341 kHz AM. Another feed of Radio Kuwait continues to broadcast to a larger audience from Dammam, Saudi Arabia, on 666 kHz daily.

A major reorganization, on medium wave, has occurred in Moscow. Radio 1 can now be found on 792 kHz, Radio 2 on 261 kHz longwave. The popular Europe Plus service is now broadcasting on 1116 kHz, and Radio SNC operates on 1260 kHz. Radio Moscow, readily heard on shortwave, is also broadcast on 1467 kHz in the Russian capitol city.

A new 600 kilowatt transmitter has gone on the air from the city of Van in eastern Turkey. Tune to 225 kHz to hear a relay of TRT's Radio One service. The Radio Voice of the People of Cambodia currently uses 1360 kHz for daily broadcasts in English at 0000 and 1200 UTC.

Credits

Many thanks to Fred Bifulco and Elisa Padilla at WNTI for an interesting visit. The *M Street Journal* and Broadcasting Magazine also provided information along with readers Ron Carruthers, Ken Hydeman, Malcolm Kaufman and W.E. Doan. Until next month, happy trails.



The Scanner Listener's Handbook

How to Hear More on Your Scanner Radio, by Ed Soomre, N1BFF.
Your guide to exploring 25-2000 MHz. Includes a detailed breakdown of band allocations and users, plus chapters on scanners, antennas, accessories, 2-way radio systems, listening laws, equipment and information sources.
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MT is an integral part of my listening hobby. I consider it an irreplaceable component in my shack.

-- 1991 Survey Comment

Hams on Satellite TV

Take a tour of Bob Heil's ham shack, Lab One, with K9EID himself as your guide. See the place where Bob comes up with improvements for his ham microphones or his satellite TV SCPC receiver.

Wander through Ronnie Milsap's recording studio and sit in with him on an 80 meter contact where he is known as WB4KCG.

Browse the endless tables at the most noted hamfest in the nation known as the Dayton Hamvention.

These are just a few of the things you're likely to see when you set your satellite dish on Spacenet 1 transponder 15 (6.80 MHz mono audio) and tune in on "QSO Amateur Radio."

The program, airing originally only on Monday evenings from 9 p.m. to midnight ET, is expected to expand to five nights a week by the time you read this. Plans include the addition of different aspects of amateur radio including the Canadian Amateur radio scene. Amateur Satellites (AMSATS), Amateur Television (ATV), and other topics including Shortwave Listening (SWL) and scanning.

Low budget programming

Longtime TVRO viewers have seen many low budget productions before and, in its way, that's one of the attractions of this medium. Anyone with \$350 and a videotape is in the satellite programming business.

Jim Bass, originator of the program and himself a newly licensed ham, has convinced a number of business friends and other like-minded companies to foot the bill for the uplink fees. In return, their advertising messages are scrolled on the screen when there isn't ham related video. The audio is then used for a nationwide talk show with Bill moderating from his home. The phone lines are live and open to anyone.

Spreading the word

Through a grass roots network of two meter repeaters, many thousands more hams are able to enjoy the audio throughout North America. What they're learning about are fascinating aspects of the hobby including a project done by Canadian hams which is called the InterProvincial Amateur Radio Network (IPARN).

Using membership dues, this organization rents an SCPC channel on Anik D2 and uses it as a repeater to access ground repeaters so that hams great distances apart in western Canada can work each other.

Looking ahead

The best part of Jim Bass' QSO Amateur Radio is that it is spontaneous and driven by the mood and actions of the participants. What direction it will take and how successful it will be is entirely up to those who take part. Jim encourages all hams to get out with their camcorders and start shooting. Show off your shack, your local club, your local repeater, you name it. You're the director on QSO Amateur Radio.

For more information on the program write: Jim Bass, QSO Amateur Radio, P.O. Box 254, Syracuse, NY 13215. For more on IPARN, write them at P.O. Box 3156, Langley, British Columbia, Canada V3A 4R5.

Satellite Shows on Satellite

Doug Dehnert's much loved Sky Store show has been off the air for several months and longtime fans eagerly await its possible return. In the meantime, there are places to go for information on the industry. Shaun Kenney's Boresight program is still around (Tuesdays and Thursdays 11:21) 10 p.m. ET, the SBCA's Information Net is still found on T303 Tuesdays and Thursdays 7 to 8:30 p.m. ET audio only (6.40 MHz).

New to satellite information programming but certainly not new to viewers is Shop At Home. The TVRO oriented shopping channel has added a dealer show to its line-up which airs the first and third Saturdays at 10 a.m. ET with repeats at 5 p.m. ET. Shop At Home also has a weekly live satellite equipment show from 9 to 11 p.m. ET on Thursday evenings with a repeat on Sunday.

Fortuna Communications Group

Fortuna Communications Corporation of Fortuna, California, has a number of publications of interest to all satellite TV enthusiasts. Most are already familiar with their weekly satellite TV program guide called *Satellite TV Week*. It's a large format, easy to read guide with many additional features including a column on the latest in satellite TV technology. *Satellite TV Week* is \$52 per year.

Fortuna also publishes a monthly magazine directed at the satellite TV industry called *TVRO Dealer*. Issues include articles specifically designed to help dealers cope with the business end of this industry as well as indepth reports on

industry related topics from such experts as Mark Long and *TVRO Dealers'* own Karl Fincke. Look here for new product reports and industry insights. *TVRO Dealer* is "circulated free of charge to satellite TV dealers, distributors, manufacturers and advertisers by request, or all others, \$12 a year."

Certainly not least in the Fortuna stable is their *Satellite TV 1991 Buyer's Guide*. This informative annual magazine is full of information for the satellite TV beginner. Articles about satellite delivered audio, data and programming subscriptions abound. Readers will also find tips on buying a system, adding accessories and setting up a home theater. For \$3.50 there's nothing like it.

For more information on any of the Fortuna publications, write them at: P.O. Box 308, Fortuna, CA 95540-0308, or call 800-345-8876.

Transponder Notes

The Voice of America, which until recently had been available only on SCPC on F2 is now on analog FM subcarrier and tunable on any satellite receiver. Frequencies are: 7.33, 7.42, 7.51 and 7.60 MHz on F2.21 which is home to USA.

Speaking of F2, NASA Select (F2.13) offers program information via the following telephone number: 202-755-1788.

For the last two years many of us have enjoyed KLON-FM on SCPC via Westar 4. They've recently made the break into big-time and are now on analog FM subcarrier (S3.15 5.58 and 5.76 MHz discreet stereo).

This Los Angeles area all-jazz public radio station originally found itself on satellite to distribute its CalNet news programs to California Public Radio stations. Later, they began distributing their "Market Place" program to public radio stations nationwide. Since then, their programming has attracted the attention of United Video, Inc. which uplinks the programming.



Mailbag

• Joe Hopper of Bulgar, Pa. has been having difficulty tuning SCPC audio on his system. He writes: "... my equipment is a Radio Shack (satellite system) and a Realistic Pro 2004 scanner. The connections I use are a splitter between the LNB and receiver, from one side of the splitter there is a DC block to the scanner. Search is done between 950 and 1300 MHz, both wide and narrow FM with a step of 5 kHz ..."

Joe, I believe your problem is that the 2004 just isn't narrow enough even in the narrowband mode. However, don't despair. You may still get SCPC from your system. For about the same price as your scanner you can get the Heil SC-One SCPC receiver and really do the thing right.

The biggest difference, aside from the fact that the SC-One is designed for music audio and scanners aren't, is that it tunes continuously through the down-converted frequencies instead of in wide steps. If you happen to have one of the very sophisticated new radio receivers such as the ICOM R-7000, you'll find they work very well indeed. The big drawback with the R-7000 is, of course, the price.

• Jon Van Allen, KF7YN, a radio officer aboard the SS California, has some information on how Armed Forces Radio and Television Service (AFRTS) programs are picked up via the INMARSAT birds. Jon says that a company from San Francisco called Redi-Marine makes its SRX-1 which "... is simply an I.F. loop (inductive pickup) to the I.F. of the INMARSAT receiver fed to an FM transmitter tuned in the 88-108 MHz FM band and fed into the ship's distribution amplifier which feeds AM, SW, and FM to each cabin and lounge, etc. on board. . .

"We took a look at the manual and decided to try our own AFRTS by laying the rubber duck of a hand held scanner next to the I.F. strip card in the receiver, and using the double I.F. frequency trick, found we could get a signal at 145.1 MHz on the scanner. . . The only problem with this is it is somewhat temporary because the Radio Officer packs up his scanner when he is relieved, but passes the info along to the next RO when he checks onboard." Jon adds that, "The issues of MT we get at sea are like gold."

• Thanks to Dan Renfro of Hickory, North Carolina, for sending in a number of interesting articles including one about a company called Mobile Telesystem Inc. The company manufactures a portable satellite telephone uplink package which fits in a single suitcase. The model is called the TCS-lite and is capable of sending voice, data or FAX messages literally from the field. The system, which includes a parabolic dish which folds up like an umbrella is said to retail for around \$55,000.

• Thanks, also, to Patrick Paventa of New Jersey for a clipping from the New York Times detailing the use of a Secondary Audio Programming (SAP) channel for Channel 13 in New York. This process, long used by cable programmers to feed second language translations of programming, is finally getting some over-the-air use. Many new TV sets have the capability of receiving these special audio channels. I would not be surprised to see more over-the-air stations around the U.S. utilizing such technology to add more value to their programming.

In addition, the article talks about the use of the Vertical Blanking Interval which is an unused line in the transmission of a picture over which data may be transmitted and received by TV sets so equipped. This is where "closed caption" information is transmitted. All sets will be required to have such decoders built-in by next year, according to this article.

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C-SPAN notes

Finally, here's a schedule of programming on C-SPAN's Audio 1. (G3.24 5.22 MHz) All times Eastern.



6:30 a.m.	Radio Korea
7:00 a.m.	Radio Japan
8:00 a.m.	CBC's "As It Happens"
9:00 a.m.	Classical music and schedule Information or historic speeches program
6:00 p.m.	World service of the Christian Science Monitor
8:00 p.m.	Radio Havana, Cuba
9:00 p.m.	Radio Japan
10:00 p.m.	Voice of Free China (Taiwan)
11:00 p.m.	Deutsche Welle midnight Radio Beijing
1:00 a.m.	Radio Austria International
2:00 a.m.	Voice of America
3:00 a.m.	Voice of Free China
4:00 a.m.	Various, including Israel Press Review, Paris Rendezvous Israel Magazine, Radio Australia in America

Moonbase America

This past spring eighty student astronauts at Copley High School participated in a week long mission inside a MOONBASE America complex. The complex, designed to simulate a future lunar base, consisted of nine geodesic domes connected by tunnel-like passageways. The domes housed various facilities such as hydroponic farming, fish hatchery, mining, sleeping quarters, communications, energy and waste management, recreation and government.

The student astronauts received extensive training for the mission during the year. Training has included Amateur Radio, scuba diving, first aid, government, physics, chemistry, mathematics, computer science, astronomy and more. More than sixty student astronauts have obtained Amateur radio licenses.

A complete Amateur Radio station was installed in the MOONBASE complex. The station included HF, VHF/UHF, Amateur Television and an Oscar station. In addition the Mission Command Center in the high school auditorium was equipped to communicate with the MOONBASE via amateur radio.

During the week long event the students had a special event amateur station on the air from the MOONBASE. Unfortunately I did not receive this information in time to alert all of you to the event. However what a fantastic idea!

This program for the first time illustrates the basic tenant of amateur radio; that is to build a strong technical community that will benefit mankind.

For too many years the only thing the amateur press could talk about was how important hams were to emergency communications. Most of us knew that simply has not been true since the end of WWII when many public service agencies began building top notch communication systems. True hams still serve in times of need, but their service is limited in most cases.

Think of it: of eighty students, sixty of them obtained amateur licenses. That's fantastic and points to the need to do more of this kind of thing in the future. I hope every high school in the world conducts similar programs!

For more information write to MOONBASE America, Copley High School 3797 Ridgewood Road, Copley, Ohio 44321 (contributed by Gary Laurenzi).

Propagation

The Solar Flux continues some crazy gyrations with levels as low as 130 and high as

220. Summer conditions will make DXing a little more difficult due to noise.

To keep abreast of what is going on with old Sol, listen to WWV's propagation bulletin at 18 minutes past the hour. When the K index is under "3" expect good conditions.

FCC Conducts Power Audits

Has the FCC knocked on your door recently? The FCC has visited 209 amateur stations to conduct power audits. The 209 lucky amateurs were mostly chosen at random to receive an FCC visit; however 31 of the stations were subjects of "interference complaints."

The FCC requested the amateur make contact with their normal power output, then reduce output by 50% or more.

They found that 75 percent of the stations did not experience any degradation in communication ability when the power was reduced. In addition interference to home entertainment equipment was reduced in one third of the cases.

80 Meter Novice Band Moved

On March 16, the 80 meter Novice band was shifted 25 kHz lower in frequency to 3.67 to 3.675 kHz. All stations using this segment are limited to 200 watts power!

I might add, that this band is still the best to use for mastering the complexities of operating Morse. Daytime range is 200 - 400 miles and at night coast to coast contacts are possible (Try it, you'll like it!).

User's Nets

ICOM user's net is held Sunday on 14,317 at 1800 UTC, Kenwood user's net is held on Sunday also on 14,317 at 1900 UTC. The Collins user's net is on Sundays at 2000 UTC on 14263. (Thanks to Ronald Hester)

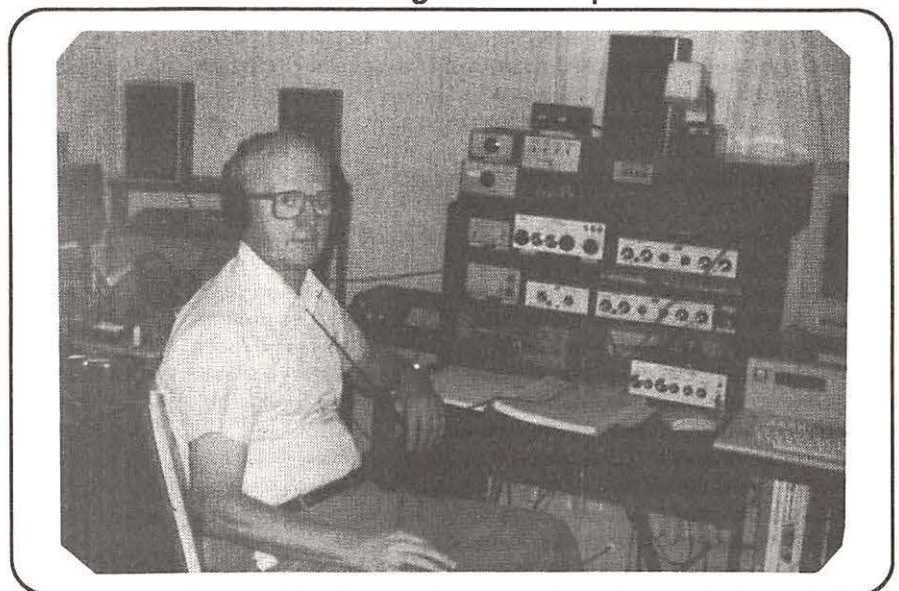
CW, SSB, vs FM

The average newcomer to VHF is attracted by FM and repeaters. To be sure FM is a lot of fun, and is handy for keeping in touch with the local crowd. But keep in mind that it is possible to work stations over much greater range using other modes; notably CW and SSB.

The reason CW and SSB are so much more effective is because these modes require less bandwidth than FM. The greater the bandwidth, the more noise your receiver will pick up and need to overcome before a signal can be copied.

FM requires about 20 kHz of bandwidth whereas CW needs less than one, and SSB only

Monitoring Post Pin-Up



Jim Keller of Lockport, NY, sent in this photo of his shack which includes a Kenwood R5000, MFJ722, MFJ75 B&C, Heath HD-1424 Preamp, along with many accessories. Jim states "I listen to the whole spectrum as time permits".

Bob Serardi's

Ham DX Tips

So, you've always wanted to take that South Seas trip. Well, while you're waiting to win the lottery to fund it, you can still take a trip of sorts, by riding the waves of the ionosphere and logging

SOUTH COOK ISLANDS ZK1CT has been a RTTY regular on 14091 kHz at 0230 UTC most days. Reports go to: Archibald Guinea, Mauke Islands, Cook Islands.

DIEGO GARCIA Tom Benton, VQ9TB, has been a regular check in to the DX net on 21335 kHz at 1700 UTC. Tom's address is: P.O. Box 55, FPO San Francisco, CA 96685.

FEDERATED STATES OF MICRONESIA Another regular net check in has been missionary Father Joseph Cavanagh, on the 14165 kHz net at 1030 UTC. Send your reports to (and by the way you can use a US 29 cent stamp to do so, but for return postage US stamps will not be any good, you'll need IRC's or a "green stamp"): Joseph Cavanagh, PATS P.O. Box 39, Ponape, TT 96941

KAZAKHSTAN If the South Seas aren't your choice then maybe you'd rather try for UL7LR who operates RTTY on 14087 kHz at 0600 UTC. Reports go: P.O. Box 97, Dzhetygara, Kazakh 45930 USSR.

WEST KIRIBATI A native here, Bob Randolph T30NAD can be logged using 50 watts of solar battery power during his daily lunch break (0100-0200 UTC) on 28485 kHz. QSL requests go to Bob's QSL manager: Hide Hidelarua Aimono, J01CRA, 2644, Tsuruda, Utsunomiya, Tochigi 320, Japan

JORDAN JY9SR can be found using code on 24905 kHz at 2000 UTC. QSL to: P.O. Box 354, Amman, Jordan

LIBERIA EL2/KC4WCV has become somewhat of a daily check in on the 21335 kHz DX net between 1600-1800 UTC. Send reports to: James Ayres, Rt 1 Box 32-B, Bradley Station, VA 22714.

MALTA 9H3AM can be logged making contacts on the Family Hour DX net 21345 kHz at 1800 UTC. His QSL manager is: D. Buckley, 16 Woodridge, Petts Wood, Orpington, Kent, England.

PANAMA HP3FL likes the relatively new WARC amateur band of 17 meters, check 18115 kHz +/- a few kHz for QRM at 0300 UTC daily. HP3FL is Frank Linardes, D, Box 76, David, Chiriqui, Panama.

SOMALIA Operating from this rarely heard African country is T5RR between 14190 and 14195 kHz at 1830 UTC. An Italian amateur, he uses QSL manager: I2JSB, Giorgio Savini, Via delle Primule 14, I-20089, Rozzano, Italy.

TURKEY RTTY fans can add this country to their log books by checking 14084 kHz at 0300 UTC for TA8C P.O. Box 13, Gaziantep, Turkey.

THAILAND One of the most beautiful of the Southeast Asian countries is once again easier for DX'ers to log, now that the club station of the Radio Amateur Society of Thailand, HS0AC, is active again. Located in the Museum of Science and Planetarium in Bangkok, the station is active most days on 14227 kHz at 1400-1600 UTC and 283001 kHz at 0100 to 0200 UTC. Send reports to: RAST, GPO Box 2008, Bangkok, 10501, Thailand.

"Til next time Gud DX and 73 de Rob.

about 2.5 kHz. Consequently CW and SSB are greatly superior to FM for working over long distances.

Suppose you can talk to a station regularly that is 60 miles distance from you on two meter FM; using SSB it would be possible to work this same station out to 150 miles or so, and even more on CW.

With this in mind, you might want to make your next rig an all mode!

Thanks for your cards and letters, keep em coming --

73 de Ike, N3IK

Grove to Address Atlanta Hamfest

MT's Bob Grove will be presenting a forum entitled, "Monitoring the Radio Spectrum" at the Atlanta Hamfest on Saturday afternoon, July 27. Bob's forums are always packed, so listeners are urged to get there early for seating.

The Atlanta Hamfest is a two-day event (Saturday and Sunday) held at the International Trade Convention Center southwest of Atlanta near the airport at the junctions of Interstate 85 and the 285 beltway.

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On the Other Side

Europirate news continues to make the headlines these days. Terry Krueger tells us Radio Fax has reactivated on 12255 kHz. Supposedly this is a 24-hour-a-day service. However, how long the folks at Radio Fax can keep that up without being closed down is questionable.

Unless the Radio Fax operation has undergone some sort of transformation since the last time the station was active, all programs are recorded in England. They are then transmitted from a site in Ireland, where hopefully a raid is less likely.

Another station which uses an Irish relay is Scotland's Radio Stella. Krueger says Stella may now be using either 11415.9 or 11393. I observed a weak carrier on 11416 one Sunday around UTC 0145. It might possibly have been Stella or some other Europirate. On lower frequencies Stella has been widely reported in North America and made it into my receiver at least twice.

According to Krueger, Germany's Rainbow Radio is now employing a relay. In this case it is England's Live Wire Radio. Check 15050 around 0400 to see if it is there. Rainbow Radio's original facilities in Germany were raided by the government authorities, although the station tried to confuse them by claiming a French location. As a result of the shut down and court procedures, we understand Rainbow's operator is very reluctant to verify reception reports at this time.

From Gregg Allinson in South Carolina comes more news about the Dutch station, Radio Tower, which was mentioned in last month's column. In response to his reception report, Gregg got a telephone call from the operator. There were over 100 reports from North America for the USB transmissions on 15050. More broadcasts on that same frequency are planned for the future.

Radio Tower transmits with a power of 100 watts or slightly higher. The transmitter site is

moved frequently as a security measure. The station operator is in his late thirties, and, like many other Europirates, was inspired to take to the airwaves by Radio Caroline.

We might note that Gregg has not done badly with domestic pirates either. Recent loggings include WYMN, with its all-female staff and Samurai Radio, The Voice Of Oriental America.

Finally we would remind you that WKNR West and North Kent Radio plan to test to North America on 15808 kHz from England during the summer months. We still have no additional details, but weekends would be the most logical times to try for them.

Things to Ponder:

A source suggests you might want to tune in WWCR 7520 kHz UTC Sundays for a program that may be somewhat more than just another shortwave religious program. The time given us was 0330, but with the coming of Daylight Savings Time, 0230 is more likely.

Some very interesting items have come our way via Frank McGuire, publisher of the *Security Intelligence Report*, and a highly-respected authority on the problems of terrorism and insurgency. In a recent issue of his newsletter, McGuire has included a fascinating and somewhat terrifying article on information that can be received these days on computer bulletin boards. These include radio-related items such as frequencies of radios and radio beacons for special forces on covert missions. If that is too tame for you, how about a definitely known way to hot-wire a strategic missile to launch it without authorization?!

Loose lips still sink ships. The radio frequencies mentioned above were posted by someone who overheard them in a bar near a military base. McGuire's source for all of this was a very concerned PhD engineer with a high-technology computer firm.

In the good news department, McGuire sent along a recent item from the much-respected *ane's Defense Weekly*. "Jane's" declares the U.S. Air Force's over-the-horizon backscatter radar program has been cancelled. Woodpeckers, at least the domestic variety, may soon be an extinct species. Few SWLs will mourn their passing.

In the "times have certainly changed department", Frank provided us with this news from the CIA's Foreign Broadcasts Information Service: Germany's Deutsche Welle is negotiating with the Soviet Ministry of Communications for the use of former Russian jammers. They would furnish improved German broadcasting to areas of Asia for 15 hours a day.

From Pennsylvania, Leslie Edwards reports United Arab Emirates Radio from Abu Dhabi in Arabic loud and clear on 13605 from 2100 to 2300 UTC.

Pirate Logs:

As usual, we have some nice pirate logs and QSL reports from "Outer Limits" readers. Let's take a look at what you have been hearing.

We have a warm hello to a special first-time reporter. It is none other than our own Bob Grove. Bob bagged **Hope Radio International** with rock, comedy, and anti-Reagan satire on 15050.7 from 1500 to 1600. He also heard them on a weekday at 0000 with a program of hard rock.

California reporter Skip Harwood found **Radio Planaria** on 7415 at 0345 in LSB. It was commenting on the results of the Gulf War. Commentator "Allard P. Fall" says the station is named after the Planarian, a worm with two eyes which cannot see. Skip also monitored the first broadcast of **Radio Soundwave** on 7425 at 0355.

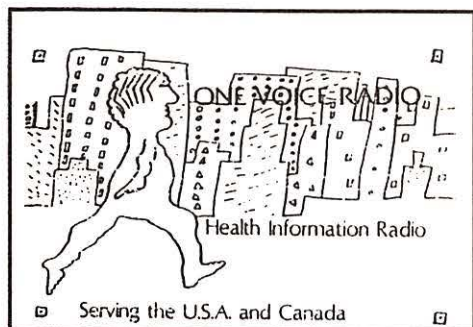
In South Carolina Gregg Stefancik found his first pirate. It was the **Pirates' Den** on 7417 at 0325. The station claims 50 watts.

From Maryland Stephen Franklin writes with some nice logs. All were on 7412 kHz. These include the **Voice of Bono** at 0425, **Radio Free Angus** at 0345, and a station at 0306 which was doing an imitation of a numbers broadcast. And speaking of numbers, what do all you numbers experts out there think of Ascension Island as a possible source of, or target for, some of the genuine transmissions?

Pat Murphy, as usual, had excellent success. He got **Radio Bland-X** on 15043 at 2301. **Hope Radio** made it to Pat's Virginia location on the frequency of 7412 at 0145 with commentary by Radio Animal on government proposals to force broadcasters to use SSB. Radio Animal opposes the idea.

Pat got another one of those great non-QSLs from CQSL, **The Pirate Voice of Mime**. This station doesn't broadcast. It just QSLs. Hey, CQSL, I did not hear you either. How about some mail to old Box 1116?

Minnesota's Alan Masyga again had much success. Alan got the Canadian pirate **Radio Beaver** on 7415 at 0002 in USB. **The Voice of Anarchy** turned up on 7413 at 0054. The legendary **Radio Clandestine** arrived on 15042.9 at 2102. We note that Alan has many logs of **Hope Radio International**. However, he adds one disturbing report. He came across an HRI transmission on 15050.5 at 1931. The station said this might be its last show as a result of an FCC visit. We have no further details at this time.

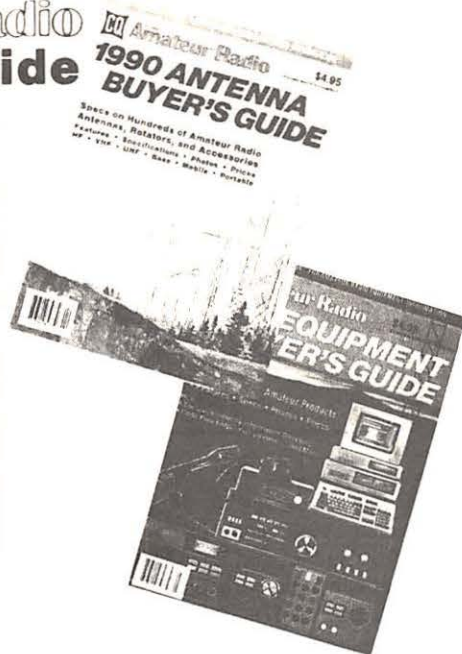


One Voice Radio QSL from the collection of John Arthur

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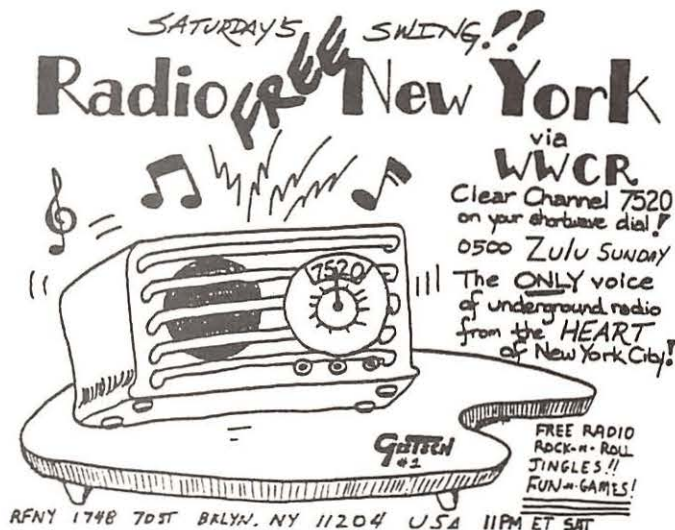
Alan also received QSLs from Hello Radio and Radio Anarchy. In the QSL department, this writer has had some success. Thanks to the gang at Radio Free New York for sending a QSL my way along with sample QSLs of those now inactive pirate stations once operated by members of the RFNY staff. As most readers know, RFNY is relayed by WWCR 7520 UTC Sundays.

Busted:

A pirate bust has been reported by an anonymous reader in Massachusetts. According to an article in the Boston Herald, 80-watt WHDL is no more. Broadcasting from Braintree, the 23-year-old operator had kept the station on the air since he was 14. The FCC vows jail time if he returns.

A Final Clandestine Item

Both Connecticut's Bob Thomas and I are hearing CIA-sponsored Voice of Free Iraq on 15600 and 17960 until sign off around 2315 UTC. Of interest lately is the reactivation of an Iraqi bubble jammer on 15600. However, 17960 has remained in the clear.



Radio Free New York QSL

Getting On The Band

Getting below 500 kHz used to be quite a challenge. It was hard to find a multiband receiver with a longwave setting on the bandswitch--and when you did, performance was often mediocre at best. Many resorted to homebrewing their own equipment or fixing up military surplus for use on LF.

Today, things are different. For listening above 100 kHz, there are many models of receivers to choose from. But what do you do if you're using an older receiver that doesn't cover the longwaves? Or what if you want to go below 100 kHz?

For a fraction of the cost of new equipment, you can add a simple outboard converter to your existing receiver (or ham transceiver) that will extend its tuning range well into the longwave band. In fact, most converters will allow you to tune far lower in frequency than you could with a stand-alone receiver. My own LF Engineering model L-101 gives reception from 500 kHz down to 10 kHz.

Installing an LF converter is easy. No modification of your receiver is necessary. You simply connect an antenna to the converter input and connect the output to your receiver's antenna jack (Figure 1). It's important to use shielded cable between the converter and your receiver to prevent unwanted bleed-through of HF signals.

A converter works by "moving" the LF band to a frequency range that can be tuned by your receiver, say, 3500-4000 kHz (80 meters). In this case, you would simply subtract 3500 from your receiver's dial reading to determine the LF frequency. In other words, 3600 = 100 kHz, 3700 = 200 kHz and so on. This is easier than it sounds and quickly becomes second nature.

A word of caution is in order if you hook up a converter to a transceiver. Be sure you don't transmit while the converter is connected. To do so would quickly destroy the delicate circuitry inside. To prevent such mishaps, it's best to disconnect the microphone and/or key from your transceiver while you're lowfing.

If you've been wanting to tune "down under," a converter offers a simple way to get in on the fun. Come on down and join us!

Summer Lowfing

Summer is now upon us and with the boating season in full swing, it's a good time to look for marine beacons that may have been quiet all winter.

Some new frequencies have shown up as a result of the continued trend to move sequenced beacons onto frequencies of their own. This

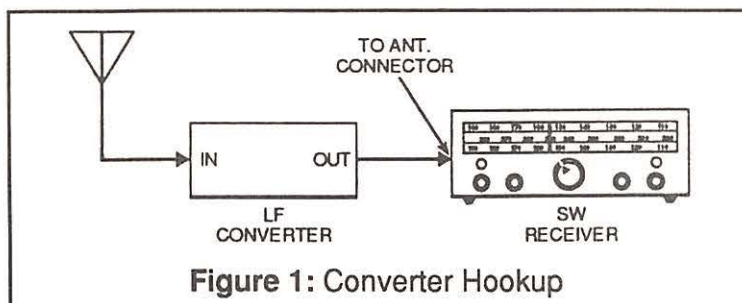


Figure 1: Converter Hookup

appears to be the case with "M" (Rochester, NY) which used to operate on 306 kHz in conjunction with four other U.S. and Canadian beacons scattered around Lake Ontario. "M" now transmits continuously on 309 kHz with a long dash after its ID.

GWEN signals are being heard again. The latest activity seems to be centered around 160 kHz with many of the stations participating. You'll recognize these signals as short, raspy bursts of energy. You need a little luck in timing because the transmissions don't appear to be on a regular schedule. As reported in the February column, the whole GWEN system is under government scrutiny because of environmental protests and budget concerns. It will be interesting to see the final outcome.

Despite occasional fits of static crashes, the warmer months do offer some logging opportunities not usually available at other times of the year.

Are you planning a summer vacation? Why not take your LF gear along for some added excitement. After a day of seeing the sights, you could scan the band for some new-to-you signals and add them to your log.

For those who enjoy the outdoors, it's a perfect time to put some fresh batteries in your portable and go on a DXpedition. Getting away from the sources of man-made noise will help you hear things you never knew were out there.

If you live fairly close to some beacon sites and enjoy a challenge, it might be fun to find out exactly where they're located. This will test your tracking skills and give you a new appreciation for what you're hearing. The built-in antennas used in many portables work quite well for direction finding. Maximum signal strength will normally be received off the front or back of the radio. Send me a picture of your catch and you might see it here in *MT*.

Logging On

Loggings have always been and will continue to be an important part of this column. Write in and tell me what you're hearing and what you use for equipment. By keeping you,

the reader involved, we can continue to be the best LF column around! Send your loggings to: Below 500 kHz, c/o Monitoring Times, P.O. Box 98, Brasstown, NC 28902.

The loggings this month are from Howard Mortimer in Baldwinsville, NY. Howard is a devoted *Monitoring Times* reader and has been on LF for two years. He uses a Kenwood TS-440 along with a very unique antenna--a 140 foot dog run! He didn't say whether or not he really has a dog, but judging from his impressive list of beacons, the scheme is working out quite well. Here's a few samples from his log:

227	EDX	Upperville, VA
256	SKN	Smithville, TN
329	CH	Charleston, SC
382	VCY	Valley City, ND
390	UCA	Ciego De Avilla, Cuba
396	ZBB	Bimini, Bahamas
*413	YHD	Dryden, Ont
415	CBC	Cayman Brac Island
417	HHG	Huntington, IN
417	IY	Charles City, IA
419	UEW	Lawrenceville, GA
429	IKY	Springfield, KY
432	IZN	Lincolnton, NC

*Includes Voice WX Broadcast

Howard mentions that he is planning to put an experimental lowfer beacon on 175 kHz using the call sign "ZWI". He'll be using a Palomar Engineers transmitter and wonders if anyone else has any experience with this unit. If you can help him out, drop me a line and I'll pass it along.

Finally, those of you in the Central, NY area might want to check out a new listener's net operating on the 2 meter ham band. Besides shortwave topics, these folks are planning some informative longwave programs as well. The net originates on 147.00 MHz from a wide coverage repeater in Auburn and meets each Friday at 8pm local time.

That wraps it up for July. Enjoy the nice weather and I'll see you next month!

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Looking Clover Over

Clover is something that grows in my back yard. It's no improvement over bluegrass, that's for sure. But when it comes to sending data on HF, that's another story. There have been several articles in the *RTTY Journal* and numerous discussions in the ham community on this new system called "Clover."

Clover isn't just another data mode like packet or AMTOR nor is it intended to be an improvement over other modes. It's actually a whole new concept designed specifically for HF digital communications. In fact, there wouldn't be any advantage in using Clover on VHF or land-line systems.

Clover is the brainchild of Ray Petit W7GHH. I had the pleasure of meeting him early this year during the Dayton Hamvention at the *RTTY Journal's* hospitality suite.

Explained Petit, "I and others were disgusted with the poor efficiency of HF packet, so I decided to develop a system that would allow the largest number of bits to be passed through the narrowest bandpass."

You are probably wondering what that means. Let's say you hitch a pickup truck and a small sports car with a trailer loaded with the same amount of cargo. The cargo is like the data. Both vehicles could probably deliver the cargo if the conditions are good (flat terrain). The sports car may even get there faster. But if the road is hilly, the sports car wouldn't have enough "gas" to climb the hill.

The same is true with data on HF. Packet is like the sports car. Clover is the truck that can deliver the data fast when conditions are good and then switch to a slow "power mode" in order to get through the mud.

His system uses a modulation scheme that is quite different from FSK. It pulses four tones in a sequence from the lowest tone to the highest. While the tones are pulsing, they are quadrature and amplitude modulated. Figure 1 shows a printout of the spectrum. The data or traffic modulates the tones and the system can switch from phase/amplitude modulation (when the frequency is clear) to phase modulation at a slower data rate during poor conditions. The pulsing rate stays the same.

When I saw the demonstration at the HAL Communications booth at Dayton, it sounded very much like Piccolo except there were four tones instead of six.

One disadvantage of Clover is that it's not compatible with any mode that's currently being used on the ham bands. It uses a scheme that recognizes other Clover stations and establishes a Clover network. Your Packet TNC would be obsolete if you wanted to buy a Clover box.

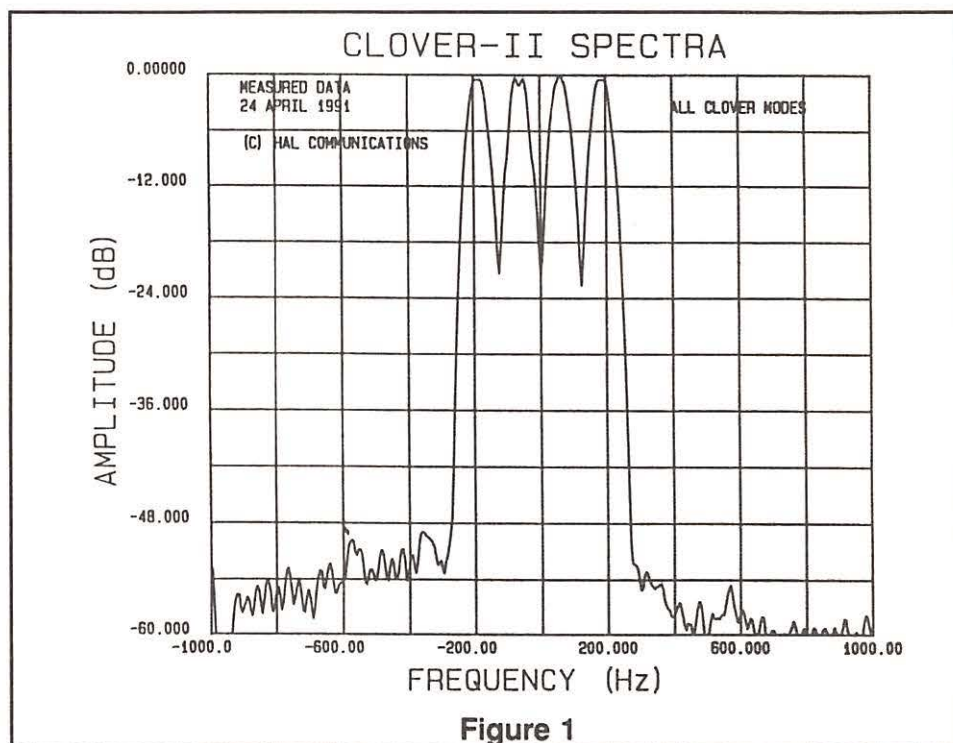


Figure 1

It also uses an error correcting scheme called Reed Solomon (another reason why it's not compatible). Hal Communications in Urbana, Illinois, will be marketing the units at a cost, so I'm told, of \$3,000 each (somewhat out of the reach of most amateurs), but I'm sure the price will come down after the government gets their hands on the first 5,000 units. The box also uses the 5600 Motorola DSP chip.

Correspondence

I received a letter from Douglas A. Blakeslee, W1KLK, who wrote the *QST* article in 1965, "RTTY for Beginners." That article inspired my "RTTY Design" contest in which I announced the winner last month. He mentioned that there had already been a series of articles that were written by Irv Hoff, but that they were written for the more prolific enthusiast. Blakeslee had felt something was needed for the people only mildly interested or they wouldn't try RTTY.

I guess this is true even today. Mr. Blakeslee said that he gets letters, even 15 years later, about the article. He also sent me a schematic that would be today's solid state equivalent.

It appears that I also made a mistake in the description of his original circuit. I said that the amplifier tube amplifies the audio from the receiver. Actually the audio is rectified by CR1 and the tube provides the current needed to drive the magnets in the TTY machine.

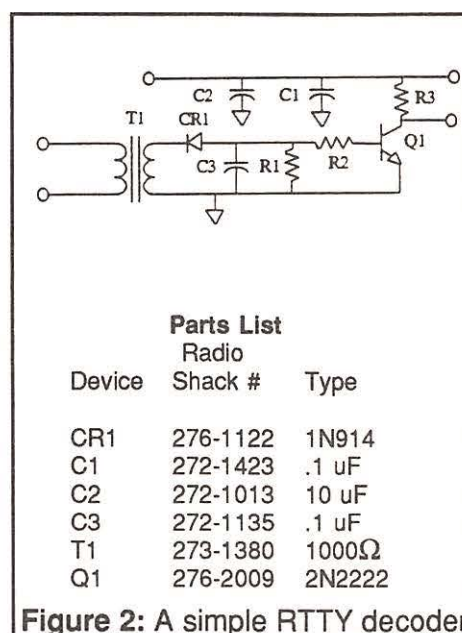


Figure 2: A simple RTTY decoder

The transistor in Figure 2 provides the same amplification as the tube, except in this case the transistor drives the RS232.

CANADA

Dept. of Transportation, Beacon "G," 400 kHz. Full data prepared QSL card, with illegible signature. Received in 20 days for an English utility report and mint first class postage. Station address: Transport Canada, Charlottetown Airport, Charlottetown, Prince Edward Island, Canada. (Holbrook, MD)

CHINA

Voice of Jinling, 4875 kHz. Full data prepared card, without verification signer. Received in 308 days for an English report and mint airmail postage. Station address: P.O. Box 268, Nanjing, Jiangsu, China. (Hardester, NC)

CZECHOSLOVAKIA

Radio Prague, 7345/9605 kHz. Full data QSL card, program schedule, and station souvenirs, without verification signer. Received in 32 days for an English report. Station address: 12099 Prague 2, Czechoslovakia. (Mayberry, TX) (Singer, CO) (Adams, NJ)

ECUADOR

HCJB, 17790/9475 kHz. Full data "T-6" QSL card, program schedule, and station souvenirs, without verification signer. Received in 43 days for an English report and mint airmail postage. Station address: Casilla 17-01-00691, Quito, Ecuador. (Mayberry, TX) (Roshelli, CA) (Adams, NJ) (Barry, CA)

GUADELOUPE

RFO-640 AM. Partial data French QSL letter, verified by G. Chow-Toun, Le chef d'Establissement. Received in 111 days for a French AM report and \$1. Station address: Societe Nationale De Radio Francaise D'Outre Mer (RFO), Boite Postal 402, 97163 Pointe a Pitre Cedex, Guadeloupe. (Holbrook, MD)

INDONESIA

Radio Republik Indo-Stasiun Regional II FakFak, 4790 kHz. Full data prepared card, verified by A. Rachman Syukur. Received in 295 days for an Indonesian follow-up report, airmail mint postage and a self-addressed envelope (both were used). Also received a station form letter. Station address: JL. Kapten P. Tendean, Kode Pos 98601, Kotak Pos 54, Indonesia. (Hardester, NC)

Radio Republik Indo-Sibolga, 5256 kHz. Full data prepared card, with illegible signature. Received in 320 days for an Indonesian follow-up report, airmail mint postage, and a self-addressed envelope (both were used). Station address: Jln Ade Irma Suryani Nasution 5, Sibolga, Sumatera Utara, Indonesia. (Hardester, NC)

ISRAEL

Kol Israel, 11605/9435 kHz. Full data logo QSL, without verification signer. Received in 54 days for an English report. Station address: Israel Radio, External Service, P.O. Box 1082, 91 010 Jerusalem, Israel. (Adams, NJ) (Wright, MS) (Pearson, FL)

JAPAN

Okinawa Nondirectional Radio Beacon "OK," 308 kHz. Full data prepared card, verified by Mitsuyoshi Zenshou-chief. Received in 333 days for an English utility report, a self-addressed envelope and airmail mint postage. Station address: Naha Radio, 344 Kagamizu, Naha-shi, Okinawa-ken, Japan. (Hardester, NC) Nice QSL, Mike-ed.

NETHERLANDS

Radio Netherlands, 11660/6020/11660/9590 kHz. Full data QSL, without verification signer. Received in 38 days for an English report. Station address: P.O. Box 222, JG Hilversum, The Netherlands. (Adams, NJ) (Dykes, SC) (Barry, CA)

NETHERLANDS ANTILLES

Trans World Radio-Bonaire, 11930/15560 kHz. Full data QSL card, program schedule, station souvenirs, without verification signer. Received in 24 days for an English report. Station address: Bonaire, Netherlands Antilles. (Mayberry, TX) (Barry, CA) (Adams, NJ)

SHIP TRAFFIC

BULKPORTOFINO-IBXX (cargo) 500 kHz. Full data letter, without verification signer. Received in 54 days for an English utility report and \$1. ship address: BULKTRALIA, APA-Via Corsico 19/9, 16128 Genoa, Italy. (Holbrook, MD)

FREDERICKSBURG-KNIN (tanker) 500 kHz. Full data prepared QSL card. Received in 19 days for an English utility report and mint first class postage. Ship address: Keystone Shipping Co., 313 Chestnut St. Philadelphia, Pa. 19106 (Holbrook, MD)

MANUKAI-KNLO (container) 22136 kHz. Full data prepared card, stamped with ship's seal. Verified by Forrest L. Thomas. Received in 26 days for an English utility report and a self-addressed stamped envelope. Ship address: c/o Matson Navigation, P.O. Box 7452, San Francisco, CA 94120. (Hill, MI)

MEDSKY-PFXD (bulk carrier) 22130 kHz. Full data prepared card, stamped with ship's seal. Verified by Tud Martinussen. Received in 23 days for an English utility report, a self-addressed stamped envelope and one IRC. (Hill, MI)

OVERSEAS NEW YORK-WMCK (oil tanker) 500 kHz. Full data prepared QSL card. Received in 39 days for an English utility report and mint first class postage. Ship address: Maritime Overseas Corp., 43 West 42nd St., New York, NY (Holbrook, MD)

PETROBULK LEOPARD-ONCC (product tanker) 500 kHz. Full data three page handwritten letter. Received in 61 days for an English utility report and \$1 which was returned. Ship address: Boelwerp NV, S.A., Mechelsesteenweg 34, Postbus 9/10, B-2000 Antwerp, Belgium. (Holbrook, MD)

USCGC SALVIA (WLB-400) NODS 5320 kHz. Full data prepared card, stamped with ship's seal, with illegible signature. Received in 30 days for an English utility report and a self-addressed stamped envelope. Ship address: c/o Coast Guard Base Mobile, South Broad St., Mobile, AL 36615-1390. (Hill, MI)

SWITZERLAND

Swiss Radio International, 17730/9885/12035 kHz. Full data QSL card, program schedule, without verification signer. Received in 37 days for an English report. Station address: CH-3000 Berne 15, Switzerland. (Mayberry, TX) (Barry, CA) (Adams, NJ) (Carson, OK)

TURKEY

Voice of Turkey, 9445 kHz. Full data scenery card, without verification signer. Received in 47



QSL from HCJB sent in by Donald M. Choleva, Euclid, Ohio.

days for an English report. Station address: Turkish Radio-TV Corporation, P.I. 333-06.443, Yenisehir, Ankara, Turkey. (Adams, NJ) (Roshelli, CA)

UNITED STATES

WVZN-1170 AM, Madison Heights, Virginia. Full data QSL letter, and souvenir bumper stickers, verified by Mark Allen, station coordinator. Received in 37 days for an English AM report and one U.S. mint postage. Station address: Noryln Bldg. Suite 205, 2702 Amherst Highway, Madison Heights, VA 24572. (Holbrook, MD)

WMEQ-880 AM, Menomonie, WI. Partial data personal note, signed by Mike, station owner. Received in six days for an English AM report and a self-addressed stamped envelope. Station address: 430 Crescent St. Menomonie, WI 54751 (Frodge, MI)

KGLO-1300 AM, Mason City, Iowa. No data form letter, signed by Sue Reilly, C.E. Received in 10 days for an English AM report and a self-addressed stamped envelope. Station address: P.O. Box 1300, 341 Yorktown Pike, Mason City, IA 50401. (Frodge, MI)

WWGZ-1530 AM, Lapeer, Michigan. Partial data handwritten note on station letterhead, verified by B.S. Hudson, station manager. Received in seven days for an English AM report and a self-addressed stamped envelope. Station address: 286 W. Nepessing St. Lapeer, MI 48446 (Frodge, MI)

USSR

Ukrainian SSR-Radio Kiev, 11770/7400 kHz. Full data scenery card, without verification signer. Received in 250 days for an English report and two IRCs. Station address: Kiev, Ukrainian SSR, USSR. (Johnston, IL) (Adams, NJ) (Lee, TX) (Wright, MS)

how to use the shortwave guide

The new shortwave guide of *Monitoring Times* is a professional level tool designed to help you hear more stations. You'll find three main elements: frequencies, propagation charts, and programming. The frequencies will tell you where to tune; the propagation charts will help you to use your listening time more effectively by predicting the likelihood of hearing a station from a particular part of the world; and the programming section will give you some idea of what to expect when you tune the station in.

The frequency section now includes virtually every English language transmission in the world including those directed to other parts of the world as well as North America. Do not be disappointed if you do not hear some of these on your first time out. Their level of difficulty ranges from "middling" to, literally, "once-in-a-lifetime." If such challenges frustrate you, stick to the frequencies directed solely to your target area.

The first four digits of a listing are the start time in UTC or "Universal Time Coordinated." Because this so-called "world time" can be confusing, we have provided corresponding local time for the Eastern ("EST") and Pacific ("PST") time zones.

The space between the transmission end and the name of the station is the broadcast schedule. If there is no entry here (as is most often the case), the transmission is made every day. In other cases, the following letters represent the days of the week the transmission can be heard:

S(Sunday)	H(Thursday)
M(Monday)	F(Friday)
T(Tuesday)	A(Saturday)
W(Wednesday)	

Other schedule codes are "ten" which means that the schedule is tentative, "tes" which means that it is a test transmission and "war" which means that the station's schedule has been disrupted by armed conflict.

The next listing is the station's name and location. Occasionally, you will find one of the following codes after the station name:

- ¹ the transmission is multi-lingual, containing both English and another language(s)
- ² the broadcast contains nothing but music
- ³ the English broadcast is transmitted irregularly
- ⁴ the transmission is an English language lesson

Frequencies are listed in ascending order, from lowest to highest. We suggest that you begin with the lowest frequency and work your way up to the highest frequency. Of course, keep in mind that the lower frequencies generally work better at night; the higher ones during the day. Not all frequencies will be audible at any given time.

Shortwave, or "world band" transmissions are often targeted to specific areas of the world. Following each frequency is a code indicating the area of the globe to which the frequency is "officially" directed. While such a scheme often gives listeners a fair idea of the likelihood of receiving a particular broadcast, remember that in shortwave, there are no hard and fast rules. Voice of America shows sent to Africa in our late evening, for example, are easily heard in North

America. Do not hesitate to try and hear any transmission listed in this section.

For easy-going, look for frequencies directed to:

- na (North America)
- ca (Central America or Caribbean)
- am (Americas)

Other codes include:

- af (Africa)
- as (Asia)
- au (Australia)
- eu (Europe)
- me (Middle East)
- pa (Pacific)
- sa (South America)

If a transmission is directed to North America and some other area, we list it as North America-bound. If it is directed to a number of different (non-American) targets, we list it as "va" (various). Transmissions marked "do" are for domestic or local consumption. Again, it is possible that you can hear these. Finally, you will occasionally see a transmission listed as "om" (omnidirectional sent out in all directions simultaneously), or "???" (we don't know where it is supposed to be going).

Remember, this is a list of all English language transmissions to the world. It includes not only the powerhouse, easy-to-hear stations from the United States, Canada, Germany and the Soviet Union, but tiny local broadcasters like the 40 watt Tristan Radio, located on a tiny island located in the middle of the South Atlantic. Your chances of hearing such a station are, quite frankly, near nil.

Desiring, however, to provide you with every possible tool so that you can effectively search out such rare fare, we also include propagation charts with this section. These are found at the conclusion of the frequency/program list and are designed to give you an idea of the best time to try for a particular station or region. Instructions for using the propagation charts are found at the beginning of that section.

A list of suggested programs can be found under the frequencies for most hours. They are listed in order of their start time in UTC. This list of programs changes every month in order to give you a wide familiarity with what shortwave's over 1,100 frequencies can bring you.

Please note that some program listings may be followed by "See X 0000. The letter stands for a day of the week (see day code legend for the frequency section). The four digits stand for a time in UTC. Listeners should check back to that date and time to find out more about that particular program.

Remember that, unlike many other publications, *Monitoring Times* makes changes to this list up to two weeks before press time and is thus able to keep this list among the most accurate in the world. Errors will naturally occur and we ask your assistance in correcting them.

You may address your corrections, additions and suggestions to Frequency Manager (or Program Manager if program details), P.O. Box 98, Brasstown, NC 28902. You may also fax changes to us at 1-704-837-2216 24 hours a day.

MT Monitoring Team**Greg Jordan, Frequency Manager***P.O. Box 98
Brasstown, NC 28902***Dave Datko***California***Tammy Wells***Maine***Jack Hubby***California***Kannon Shanmugam****Program Manager***P.O. Box 98
Brasstown, NC 28902***John Carson***Oklahoma***Jim Frimmel***Texas***newsline**

"Newsline" is your guide to news broadcasts on the air. ■ All broadcasts are world news reports unless followed by an asterisk, which means the broadcast is primarily national news. ■ All broadcasts are daily unless otherwise noted by the day codes.

**0000 UTC
(8:00 PM EDT, 5:00 PM PDT)**

BBC
CBC, Northern Quebec
Christian Science Monitor
Kol Israel
Radio Australia
Radio Beijing
Radio Canada Int'l [S-M]
Radio Havana Cuba [T-S]
Radio Korea
Radio Luxembourg
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Prague Int'l
Radio Thailand
Radio Yugoslavia
Spanish Foreign Radio
Voice of America
WWCR (USA Radio News) [T-S]
0005
Radio Pyongyang
0010
Radio Beijing*
0030
Christian Science Monitor (Asia)
[M]
Christian Science Monitor [T-F]
HCJB*
Radio Budapest
Radio Havana Cuba [T-S]
Radio Netherlands [T-S]
Voice of America (Americas,
East Asia) (Special English) [T-
S]
Voice of America (East Asia)
(Special English) [M]
0045
Radio Korea (News Service)
0055
WRNO (ABC News) [W, A]

**0100 UTC
(9:00 PM EDT, 6:00 PM PDT)**

All India Radio

BBC
CBC, Northern Quebec [S-M]
Christian Science Monitor
Deutsche Welle
Kol Israel
Radio Australia
Radio Belize
Radio Canada Int'l [S-M]
Radio Havana Cuba [T-S]
Radio Japan
Radio Luxembourg
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Thailand
Radiotelevisione Italiana
Spanish Foreign Radio
Voice of America
Voice of Indonesia
WWCR (USA Radio News) [T-A]
0115
Radio Havana Cuba* [T-S]
0120
Radio for Peace Int'l [T-A]
0125
HCJB
0130
Christian Science Monitor (Asia)
[M]
Christian Science Monitor [T-F]
Radio Austria Int'l
Radio Havana Cuba [T-S]
Radio Portugal [T-A]
Voice of Greece [M-A]
0155
Voice of Indonesia

**0200 UTC
(10:00 PM EDT, 7:00 PM PDT)**

BBC
CBC, Northern Quebec [T-S]
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Canada Int'l [T-A]
Radio Havana Cuba [T-S]

Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Prague Int'l
Radio Romania Int'l
Radio Thailand
RAE, Buenos Aires [T-A]
Swiss Radio Int'l
Voice of America
Voice of Free China
Voice of Myanmar
WWCR (USA Radio News) [T-S]
0215
Radio Cairo
0230
Christian Science Monitor
(Africa, Europe) [M]
Christian Science Monitor [T-F]
HCJB*
Radio Havana Cuba [T-S]
Radio Pakistan (Special English)
Radio Tirana, Albania
0245
Radio Korea (News Service)
0250
Radio for Peace Int'l [T-A]
Radio Yerevan

**0300 UTC
(11:00 PM EDT, 8:00 PM PDT)**

BBC
CBC, Northern Quebec
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Beijing
Radio Belize
Radio Havana Cuba [T-S]
Radio Japan
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Prague Int'l
Radio Sofia
Radio Thailand
Voice of America
Voice of Free China
Voice of Turkey

WRNO (ABC News) [F]
WWCR (USA Radio News) [M-
A]
0305
Radio New Zealand Int'l* [M-F]
0309
BBC*
0310
Radio Beijing*
0315
Radio Cairo
Radio Havana Cuba* [T-S]
0325
HCJB
0330
BBC (Africa)*
Christian Science Monitor
(Africa, Europe) [M]
Christian Science Monitor [T-F]
Radio Havana Cuba [T-S]
Radio Moscow (World Service)
Radio Netherlands [T-S]
Radio Tirana, Albania
UAE Radio, Dubai
0340
Voice of Greece [M-A]
0350
Radiotelevisione Italiana
0355
Radio Japan [M-F]
WYFR (Network) [T-A]

**0400 UTC
(12:00 AM EDT, 9:00 PM PDT)**

BBC
CBC, Northern Quebec [T-S]
Christian Science Monitor
Deutsche Welle
Kol Israel
Radio Australia
Radio Beijing
Radio Canada Int'l
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int'l [M-A]
Radio Romania Int'l

Radio RSA
Radio Tanzania
Radio Thailand
Swiss Radio Int'l
Voice of America
WWCR (USA Radio News) [T-A]
0405
Radio Pyongyang
0410
Radio Beijing*
0425
Radiotelevisione Italiana
0430
Christian Science Monitor
(Africa, Europe, NE Asia) [M]
Christian Science Monitor [T-F]
Radio Botswana
Radio Canada Int'l [M-F]
Radio Havana Cuba [T-S]
Radio Moscow (World Service)
Radio Tirana, Albania
0450
Radio RSA

**0500 UTC
(1:00 AM EDT, 10:00 PM PDT)**

BBC
CBC, Northern Quebec
Christian Science Monitor
Deutsche Welle
HCJB*
Radio Australia
Radio Beijing
Radio Havana Cuba [T-S]
Radio Japan
Radio Lesotho
Radio Moscow
Radio New Zealand Int'l [M-F]
Radio Thailand
Spanish Foreign Radio
Voice of America
0505
Radio New Zealand Int'l* [M-F]
0510
Radio Beijing*
Radio Botswana

newsline

0515

Radio Canada Int'l [M-F]
Radio Havana Cuba* [T-S]
0530
BBC (Africa)*
Christian Science Monitor
(Africa, Europe, NE Asia) [M]
Christian Science Monitor [T-F]
Radio Austria Int'l
Radio Havana Cuba [T-S]
Radio Moscow (World Service)
Radio Romania Int'l
Radio Thailand
UAE Radio, Dubai
Voice of Nigeria
0540
Radio Prague Int'l
0545
Voice of Nigeria*
0550
Radio for Peace Int'l [T-A]
0555
HCJB

0600 UTC

(2:00 AM EDT, 11:00 PM PDT)

BBC
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int'l [M-F]
Voice of America
0605
Radio Pyongyang
0610
Voice of Malaysia
0630
BBC (Africa)*
BRT, Brussels
Christian Science Monitor [M-F]
Radio Finland [T-A]
Radio Havana Cuba [T-S]
Radio Moscow (World Service)
Radio Polonia
Radio Prague Int'l
Radio Sofia
Radio Tirana, Albania
RTV Congolaise, Brazzaville [M-F]
Swiss Radio Int'l
0645
Radio Romania Int'l

0700 UTC

(3:00 AM EDT, 12:00 AM PDT)

BBC
Christian Science Monitor
Radio Australia
Radio Havana Cuba [T-S]
Radio Japan
Radio Moscow (World Service)
Radio Tirana, Albania
Voice of Free China
Voice of Myanmar
0715
Radio Havana Cuba* [T-S]

0720

Radio for Peace Int'l [T-A]
0730
BBC (Africa)* [M-A]
Christian Science Monitor [M-F]
HCJB*
Radio Austria Int'l
Radio Havana Cuba [T-S]
Radio Moscow (World Service)
Radio Netherlands [M-A]
0755
Radio Japan [M-F]

0800 UTC

(4:00 AM EDT, 1:00 AM PDT)

BBC
Christian Science Monitor
Radio Australia
Radio Finland [T-A]
Radio Korea
Radio Moscow (World Service)
Voice of Indonesia
0805
Radio Pyongyang
0810
Voice of Malaysia
0825
HCJB
0830
Christian Science Monitor [M-F]
Radio Finland [T-A]
Radio Moscow (World Service)
Radio Netherlands [M-A]
Swiss Radio Int'l
0840
Voice of Greece [M-A]
0855
Voice of Indonesia

0900 UTC

(5:00 AM EDT, 2:00 AM PDT)

BBC
BRT, Brussels [M-A]
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Beijing
Radio Japan
Radio Moscow (World Service)
0910
Radio Beijing*
0915
Radio Korea (News Service)
0930
Christian Science Monitor [M-F]
Deutsche Welle (Africa)* [M-F]
Radio Moscow (World Service)
0955
Radio Japan [M-F]

1000 UTC

(6:00 AM EDT, 3:00 AM PDT)

All India Radio
BBC
Christian Science Monitor
HCJB*

Kol Israel

Radio Australia
Radio Beijing
Radio Moscow (World Service)
Radio Tanzania
Swiss Radio Int'l
Voice of America
1010
Radio Beijing*
1030
Christian Science Monitor [M-F]
Radio Austria Int'l [M-F]
Radio Moscow (World Service)
Radio Netherlands [M-A]
UAE Radio, Dubai
1040
Voice of Greece [M-A]
1050
Radio Finland [T-F]
1055
All India Radio
HCJB

1100 UTC

(7:00 AM EDT, 4:00 AM PDT)

BBC
CBC, Northern Quebec [A-S]
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Beijing
Radio Japan
Radio Jordan
Radio Korea
Radio Moscow (World Service)
Radio RSA
Swiss Radio Int'l
Trans World Radio, Bonaire [M-F]
Voice of America
1105
Radio Pakistan (Special English)
Radio Pyongyang
1109
BBC*
1110
Radio Beijing*
Radio Belize [T-A]
Radio Botswana [M-F]
1115
Radio Korea (News Service)
1125
Radio Belize [M]
Radio Botswana [A-S]
1130
BRT, Brussels [S]
Christian Science Monitor [M-F]
Deutsche Welle* [M-F]
Radio Austria Int'l [M-F]
Radio Korea [M-S]
Radio Lesotho
Radio Moscow (World Service)
Radio Netherlands [M-A]
1135
Radio Thailand
1150
Radio RSA
1155
Radio Japan [M-F]

1200 UTC

(8:00 AM EDT, 5:00 AM PDT)

BBC
CBC, Northern Quebec [A-S]
Christian Science Monitor
Radio Australia
Radio Beijing
Radio Bras, Brasilia [M-A]
Radio Canada Int'l [M-F]
Radio Finland [T-F]
Radio Moscow (World Service)
Radio Polonia
Radio Romania Int'l
Radio Tashkent
Radio Thailand
Radio Yugoslavia
Swiss Radio Int'l
Voice of America
WWCR (USA Radio News) [S-F]
1210
Radio Beijing*
1215
Radio Korea
1230
Christian Science Monitor [M-F]
Radio Cairo
Radio France Int'l
Radio Moscow (World Service)
Trans World Radio, Bonaire [M-A]
Voice of Turkey
1235
Voice of Greece
1255
WYFR (Network) [M-F]

1300 UTC

(9:00 AM EDT, 6:00 AM PDT)

BBC ("Newshour")
BRT, Brussels [M-A]
CBC, Northern Quebec
Christian Science Monitor
Radio Australia
Radio Beijing
Radio Belize
Radio Canada Int'l (North America) [S]
Radio Finland [T-A]
Radio Jordan
Radio Moscow (World Service)
Radio Peace and Progress
Radio Romania Int'l
Radio Tanzania [A-S]
Radio Tirana, Albania
Trans World Radio, Bonaire [S]
Voice of America
WWCR (USA Radio News) [M-F]
1305
Radio Pyongyang
1310
Radio Beijing*
1325
HCJB [M-F]
1328
Radio Cairo
1330
All India Radio
Christian Science Monitor [M-F]

Radio Austria Int'l
Radio Canada Int'l
Radio Korea (News Service)
Radio Moscow (World Service)
Radio Tashkent
Swiss Radio Int'l
UAE Radio, Dubai
Voice of America (Special English)
1346
All India Radio (UN News) [A]

1400 UTC

(10:00 AM EDT, 7:00 AM PDT)

BBC
CBC, Northern Quebec [A-S]
Christian Science Monitor
Radio Australia
Radio Beijing
Radio Belize [M-F]
Radio Canada Int'l
Radio Finland [T-A]
Radio France Int'l
Radio Japan
Radio Korea
Radio Moscow (World Service)
Voice of America
WWCR (USA Radio News)
1405
Radio Pyongyang
1410
Radio Beijing*
1425
HCJB [M-F]
Radio Finland
1430
Christian Science Monitor [M-F]
Radio Austria Int'l [M-F]
Radio Moscow (World Service)
Radio Netherlands [M-A]
Radio Polonia
1445
BBC (East Asia) (Special English) [M-F]
Voice of Myanmar
1455
All India Radio

1500 UTC

(11:00 AM EDT, 8:00 AM PDT)

BBC
CBC, Northern Quebec [A-S]
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Beijing
Radio Belize [M-A]
Radio Canada Int'l
Radio Japan
Radio Jordan
Radio Moscow (World Service)
Radio Portugal [M-F]
Radio Romania Int'l
Radio RSA
Voice of America
WWCR (USA Radio News) [M-F]
1505
Radio Pyongyang

newsline

1510
Radio Beijing*
1530
Christian Science Monitor [M-F]
Deutsche Welle* [M-F]
FEBA, Seychelles
Radio Moscow (World Service)
Radio Tirana, Albania
Swiss Radio Int'l
Voice of Greece [M-A]
1545
Radio Korea (News Service)

1600 UTC
(12:00 PM EDT, 9:00 AM PDT)

BBC
CBC, Northern Quebec [A]
Christian Science Monitor
Deutsche Welle
Radio Australia
Radio Beijing
Radio Canada Int'l
Radio France Int'l
Radio Jordan
Radio Korea
Radio Lesotho
Radio Moscow (World Service)
Radio New Zealand Int'l [M-F]
Radio Polonia
Radio RSA
Radio Tanzania
Voice of America
1605
Radio New Zealand Int'l* [M-F]
1609
BBC*
1610
Radio Beijing*
Radio Botswana [M-F]
1630
Christian Science Monitor [M-F]
Radio Austria Int'l
Radio Moscow (World Service)
Radio Netherlands [M-A]
Radio Peace and Progress
Radio Polonia
UAE Radio, Dubai
Voice of America (except Africa)
(Special English)
WYFR (Network) [A]
1635
WYFR (Network) [M-F]

1700 UTC
(1:00 PM EDT, 10:00 AM PDT)

BBC
CBC, Northern Quebec [A]
Christian Science Monitor
Kol Israel
Radio Australia
Radio Beijing
Radio Belize [M-F]
Radio Canada Int'l
Radio Japan
Radio Moscow (World Service)
Radio New Zealand Int'l [S-F]
Radio Prague Int'l
Radio RSA
Voice of America
WWCR (USA Radio News) [A]

1705
Radio Pyongyang
1709
BBC (Africa)* [A-S]
1710
Radio Beijing*
1715
Radio Korea (News Service)
1725
WYFR (Network) [A]
1730
BRT, Brussels
Christian Science Monitor [M-F]
Radio Moscow (World Service)
Radio Romania Int'l
Swiss Radio Int'l
1740
BBC (Africa)* [M-F]
1750
Radio RSA

1800 UTC
(2:00 PM EDT, 11:00 AM PDT)

All India Radio
BBC
CBC, Northern Quebec [M-F]
Christian Science Monitor
KVOH (UPI News)
Radio Australia
Radio Belize [M-F]
Radio Bras, Brasilia [M-A]
Radio Canada Int'l
Radio Korea
Radio Moscow (World Service)
Radio New Zealand Int'l [S-F]
Radio Tanzania
Voice of America
WWCR (USA Radio News) [M-F]
1803
Radio Jamahiriya, Libya
1830
Christian Science Monitor [M-F]
Radio Belize
Radio Budapest
Radio Finland [M-F]
Radio Moscow (World Service)
Radio Netherlands [M-A]
Radio Polonia
Radio Prague Int'l
Radio Sofia
Radio Tirana, Albania
Radio Yugoslavia
Swiss Radio Int'l
Voice of America (Special English)
1840
SLBC, Sri Lanka
Voice of Greece
1847
Radio Jamahiriya, Libya
1855
BBC (Africa)* [M-F]
Radio Finland
WYFR (Network) [M-A]
1900 UTC
(3:00 PM EDT, 12:00 PM PDT)
All India Radio
BBC

Christian Science Monitor [M-A]
Deutsche Welle
HCJB*
Kol Israel
KVOH (UPI News)
Radio Australia
Radio Beijing
Radio Canada Int'l
Radio Havana Cuba [M-A]
Radio Japan
Radio Moscow (World Service)
Radio New Zealand Int'l [S-F]
Radio Tanzania
RAE, Buenos Aires [M-F]
Spanish Foreign Radio
Swiss Radio Int'l
Voice of America
1905
Radio New Zealand Int'l* [S-H]
1910
Radio Beijing*
Radio Botswana
1920
Voice of Greece
1930
Christian Science Monitor [M-F]
Deutsche Welle* [M-F]
Radio Austria Int'l
Radio Havana Cuba [M-A]
Radio Moscow (World Service)
Radio Romania Int'l
1935
Radiotelevisione Italiana
1945
Radio Korea (News Service)
1955
HCJB

2000 UTC
(4:00 PM EDT, 1:00 PM PDT)

BBC
CBC, Northern Quebec [S-F]
Christian Science Monitor
KVOH (UPI News)
Radio Australia
Radio Beijing
Radio Belize [M-F]
Radio Havana Cuba [M-A]
Radio Kiev
Radio Moscow (World Service)
Radio New Zealand Int'l [S-F]
Radio Polonia
Radio Portugal [M-F]
Radio Prague Int'l
Voice of America
Voice of Indonesia
Voice of Turkey
2005
Radio Pyongyang
2010
Radio Beijing*
2025
Radio Havana Cuba* [M-A]
Radiotelevisione Italiana
WYFR (Network) [M-F]
2030
Christian Science Monitor [M-F]
Radio Budapest
Radio Havana Cuba [M-A]

Radio Korea
Radio Moscow (World Service)
Radio Netherlands [M-A]
Radio Sofia
WYFR (Network) [A]
2045
Radio Korea (News Service)
2050
Radio for Peace Int'l [M-F]
2055
Voice of Indonesia

2100 UTC
(5:00 PM EDT, 2:00 PM PDT)

All India Radio
BBC ("Newshour")
BRT, Brussels
CBC, Northern Quebec [S-F]
Christian Science Monitor [M-A]
Deutsche Welle
KVOH (UPI News)
Radio Australia
Radio Beijing
Radio Belize [M-F]
Radio Canada Int'l
Radio Finland [M-F]
Radio Japan
Radio Moscow (World Service)
Radio New Zealand Int'l [S-F]
Radio Peace and Progress
Radio Portugal [M-F]
Radio Prague Int'l
Radio Romania Int'l
Radio Yugoslavia
Spanish Foreign Radio
Swiss Radio Int'l
Voice of America
2110
Radio Beijing*
2130
Christian Science Monitor [M-F]
Kol Israel
Radio Cairo
Radio Canada Int'l [A-S]
Radio Moscow (World Service)
Radio Sofia
Radio Vilnius
Swiss Radio Int'l
WYFR (Network) [M-F]
2155
WYFR (Network) [M-A]

2200 UTC
(6:00 PM EDT, 3:00 PM PDT)

All India Radio
BBC
CBC, Northern Quebec [M-F]
Christian Science Monitor
Radio Australia
Radio Beijing
Radio Canada Int'l
Radio Havana Cuba [M-A]
Radio Moscow
Radio New Zealand Int'l [S-F]
Radio Vilnius
Radiotelevisione Italiana
Voice of America

Voice of Free China
Voice of Turkey
2208
Voice of America (Caribbean)*
[M-F]
2210
Radio Beijing*
2220
Radio for Peace Int'l [M-F]
2225
Radio Havana Cuba* [M-A]
2230
Christian Science Monitor [M-F]
Radio Havana Cuba [M-A]
Radio New Zealand Int'l [S-H]
Radio Polonia
Radio Tirana, Albania
Voice of America (Special English)
2233
Radio Jamahiriya, Libya
2245
Voice of Greece

2300 UTC
(7:00 PM EDT, 4:00 PM PDT)

BBC
CBC, Northern Quebec [A]
Christian Science Monitor [M-A]
Kol Israel
Radio Australia
Radio Belize [M-F]
Radio Canada Int'l
Radio Finland [M-F]
Radio Japan
Radio Kiev
Radio Luxembourg
Radio Moscow
Radio New Zealand Int'l [S-F]
Radio Prague Int'l
Radio Sofia
Voice of America
WWCR (USA Radio News) [M-F]
2305
Radio Polonia
Radio Pyongyang
2315
All India Radio
2320
Radio Thailand
2330
BRT, Brussels
Christian Science Monitor [M-F]
Radio Budapest [M-A]
Radio Jamahiriya, Libya
Radio Tirana, Albania
2355
Radio Japan [M-F]
WRNO (ABC News) [W, F]

0000 UTC**[8:00 PM EDT/5:00 PM PDT]****FREQUENCIES**

0000-0015	Voice of the People of Cambodia, Phnom-Penh	9695 _{as}	11938 _{as}
0000-0030	Radio Canada Int'l, Montreal	5960 _{na}	9755 _{na} 13760 _{na}
0000-0030	Kol Israel, Jerusalem	9435 _{na}	11605 _{na} 15640 _{na}
0000-0030	Radio Australia, Melbourne	13605 _{va}	15160 _{va} 15240 _{va}
		15320 _{va}	17715 _{va} 17630 _{va}
		17750 _{va}	17795 _{va}
0000-0030 stwhfa	Radio Prague, Czechoslovakia	7345 _{na}	11685 _{na} 11990 _{na}
0000-0030	BBC London, England	5965 _{va}	5975 _{va} 6005 _{va}
		6175 _{va}	6195 _{va} 7145 _{va}
		7325 _{va}	9410 _{va} 9590 _{va}
		9670 _{va}	9915 _{va} 11750 _{va}
		11945 _{va}	11955 _{va} 12095 _{va}
		15070 _{va}	15260 _{va} 15360 _{va}
		17830 _{va}	21715 _{pa}
0000-0050	Radio Yugoslavia, Belgrade	9620 _{na}	11735 _{na}
0000-0100	All India Radio, Delhi	9535 _{as}	9910 _{as} 11715 _{as}
		11745 _{as}	15110 _{as}
0000-0100	ABC Brisbane, Australia	4920 _{do}	9660 _{do}
0000-0100	ABC Perth, Australia	9610 _{do}	
0000-0100 sm	Radio Canada Int'l, Montreal	5960 _{na}	9755 _{na}
0000-0100	CFRX, Toronto	6070 _{do}	
0000-0100	CBN, Canada	6160 _{do}	
0000-0100	FEBC Radio Int'l, Philippines	15490 _{as}	
0000-0100	Radio Beijing, China	9770 _{am}	11715 _{am} 15100 _{am}
		17705 _{am}	
0000-0100	Christian Science World Service	7395 _{na}	9850 _{na} 13760 _{na}
		17555 _{na}	17865 _{va}
0000-0100	Radio Havana Cuba	11950 _{am}	
0000-0100	Radio Moscow World Service	7370 _{va}	17655 _{va} 17890 _{va}
0000-0100	Radio Moscow N. American Svc.	9530 _{na}	9685 _{na} 9720 _{na}
		11780 _{na}	11850 _{na} 12040 _{na}
		15290 _{na}	15315 _{na} 15355 _{na}
		17605 _{na}	17665 _{na} 17700 _{na}
		21480 _{na}	
0000-0100	Radio Korea, Seoul, S. Korea	15575 _{na}	
0000-0100	Radio Luxembourg	6090 _{om}	15350 _{om}
0000-0100 smtwhf	Radio New Zealand Int'l	17770 _{pa}	

0000-0100	Radio Pyongyang, North Korea	11335 _{na}	13775 _{na} 15115 _{na}
0000-0100	RTV Malaysia, Radio 4	7295 _{do}	
0000-0100	SBC Radio 1, Singapore	5010 _{do}	5052 _{do} 11940 _{do}
0000-0100	SLBS, Freetown, Sierra Leone	3316 _{do}	
0000-0100	Radio Thailand, Bangkok	4830 _{as}	9655 _{as} 11905 _{as}
0000-0100	Spanish Foreign Radio, Madrid	9630 _{na}	11880 _{na}
0000-0100	Voice of America, Washington	7120 _{as}	9770 _{as} 11760 _{as}
		15185 _{as}	15290 _{as} 17735 _{as}
		17820 _{as}	
0000-0100	Radio Kiev, Ukraine	11790 _{na}	13645 _{na} 15180 _{na}
		15455 _{na}	15485 _{na}
0000-0100	KTBN Salt Lake City, Utah	15590 _{am}	
0000-0100	R. for Peace Int'l, Costa Rica	7375 _{na}	13630 _{na} 15030 _{na}
		21566 _{na}	
0000-0100	WRNO New Orleans, Louisiana	7355 _{am}	
0000-0100	WHRI Noblesville, Indiana	7315 _{am}	9495 _{am}
0000-0100	WINB Red Lion, Pennsylvania	15145 _{eu}	
0000-0100	WYFR, Okeechobee, Florida	5985 _{am}	
0000-0100	CFCX, Montreal	6005 _{do}	
0000-0100	WWCR Nashville, Tennessee	7520 _{na}	
0000-0100	Voice of America, Washington	5995 _{ca}	6130 _{ca} 9455 _{ca}
		9775 _{ca}	9815 _{ca} 11580 _{ca}
		11695 _{ca}	15205 _{ca}
0015-0030 m	Radio Prague, Czechoslovakia	7345 _{na}	9540 _{na} 11990 _{na}
0030-0100	BBC London, England	5975 _{va}	6005 _{va} 6175 _{va}
		7325 _{va}	9590 _{va} 9670 _{va}
		9915 _{va}	11750 _{va} 11945 _{va}
		11955 _{va}	12095 _{va} 15070 _{va}
		15260 _{va}	15360 _{va} 21715 _{pa}
0030-0100	HCJB Quito, Ecuador	9745 _{am}	15155 _{am} 21455 _{am}
		25950 _{am}	
0030-0100	Radio Australia, Melbourne	11880 _{va}	13605 _{va} 15240 _{va}
		15465 _{va}	17630 _{va} 17750 _{va}
		17795 _{va}	17855 _{va} 21740 _{va}
0030-0100	Hunan PBS, Changsha, China	4990 _{do}	
0030-0100	Radio Netherlands, Hilversum	6020 _{am}	6165 _{am} 15560 _{am}
0030-0100	Radio Budapest, Hungary	6110 _{na}	9520 _{na} 9585 _{na}
		9835 _{na}	11910 _{na} 15160 _{na}
0030-0100	Sri Lanka B'casting Corp.	6005 _{as}	9720 _{as} 15425 _{as}
0050-0100	Vatican Radio, Vatican City	6150 _{na}	9605 _{na}

SELECTED PROGRAMS**Sundays**

- 0005 Christian Science Monitor: Herald of Christian Science. Religious programming explaining the doctrine of Christian Science.
- 0015 Radio Korea: News Commentary. Opinion on developments in Korea and worldwide.
- 0020 Radio Korea: Sites and Sounds. A look at Korea's tourist attractions and industry.
- 0030 BBC: The Ken Bruce Show. Ken Bruce plays pop music, past and present.
- 0035 Radio Korea: From Us to You. Listener letters, questions, and comments, interspersed with Korean music.

Mondays

- 0005 Christian Science Monitor (Europe, Americas): The Sunday Service. See S 1605.
- 0006 Christian Science Monitor (Asia): News Focus. In-depth news analyses, focusing on major international events.
- 0015 Radio Korea: Echoes of Korean Music. See S 1115.
- 0030 BBC: In Praise Of God. Christian religious services and meditations.
- 0034 Christian Science Monitor (Asia): Home Forum. Home and family affairs.
- 0035 Radio Korea: Shortwave Feedback. See S 1135.

Tuesdays

- 0006 Christian Science Monitor: News Focus. See M 0006.
- 0015 Radio Korea: News Commentary. See S 0015.
- 0020 Radio Korea: Seoul Calling. See M 1120.
- 0030 BBC: Panel Game. "Jazz Score" with Benny Green features tales from the colorful world of jazz



Chris Bickerton is one of the presenters on the BBC's regional program "Focus on Africa."

(through August 6th).

- 0034 Christian Science Monitor: Kaleidoscope. See M 1634.
- 0040 Radio Korea: Let's Learn Korean! See M 1140.
- 0045 Radio Korea: Sports Roundup. See M 1145.

Wednesdays

- 0006 Christian Science Monitor: News Focus. See M 0006.
- 0015 Radio Korea: News Commentary. See S 0015.
- 0020 Radio Korea: Seoul Calling. See M 1120.
- 0030 BBC: Omnibus. Topical features on almost any topic, from Dracula to drugs.
- 0034 Christian Science Monitor: Kaleidoscope. See M

1634.

- 0040 Radio Korea: Let's Learn Korean! See M 1140.
- 0045 Radio Korea: Korean Cultural Variety. See T 1145.

Thursdays

- 0006 Christian Science Monitor: News Focus. See M 0006.
- 0015 Radio Korea: News Commentary. See S 0015.
- 0020 Radio Korea: Seoul Calling. See M 1120.
- 0030 BBC: Comedy Show (except August 1st: "Two Cheers For July"). See W 1530.
- 0034 Christian Science Monitor: Kaleidoscope. See M 1634.
- 0040 Radio Korea: Let's Learn Korean! See M 1140.
- 0045 Radio Korea: Pulse of Korea. See W 1145.

Fridays

- 0006 Christian Science Monitor: News Focus. See M 0006.
- 0015 Radio Korea: News Commentary. See S 0015.
- 0020 Radio Korea: Seoul Calling. See M 1120.
- 0030 BBC: Music Feature. Topical programming on various musical subjects.
- 0034 Christian Science Monitor: Home Forum. Home and family affairs.
- 0040 Radio Korea: Let's Learn Korean! See M 1140.
- 0045 Radio Korea: Focus This Week. See H 1145.

Saturdays

- 0005 Christian Science Monitor: Herald of Christian Science. See S 0005.
- 0015 Radio Korea: News Commentary. See S 0015.
- 0020 Radio Korea: Let's Sing Together. See F 1120.
- 0030 BBC: From The Weeklies. A review of the British weekly press.
- 0045 BBC: Recording Of The Week. See S 0315.
- 0045 Radio Korea: Listeners' Forum. See F 1145.

0100 UTC**[9:00 PM EDT/6:00 PM PDT]****FREQUENCIES**

0100-0105	Vatican Radio, Vatican City	6150 _{na}	9605 _{na}
0100-0115	All India Radio, Delhi	9535 _{as}	9910 _{as} 11715 _{as}
		11745 _{as}	15110 _{as}
0100-0120	RAI, Rome, Italy	9575 _{am}	11800 _{am}
0100-0125	Kol Israel, Jerusalem	9435 _{na}	11605 _{na} 15640 _{na}
0100-0125	Radio Netherlands, Hilversum	6020 _{am}	6165 _{am} 15560 _{am}
0100-0130 SM	Radio Norway, Oslo	11925 _{na}	15360 _{na}
0100-0130	Nat'l Radio of Laos, Vientiane	7112 _{as}	
0100-0130	Radio Canada Int'l, Montreal	9535 _{am}	9755 _{am} 11845 _{am}
		11940 _{am}	13720 _{am}
0100-0130	Radio Prague, Czechoslovakia	5930 _{na}	7345 _{na} 11685 _{na}
0100-0130	Radio Sweden, Stockholm	9765 _{as}	
0100-0150	Deutsche Welle, Koln, Germany	6040 _{na}	6145 _{na} 6155 _{na}
		9565 _{na}	11865 _{na}
		11890 _{na}	13610 _{na} 13770 _{na}
		15105 _{na}	15425 _{na}
0100-0200 sm	Radio Canada Int'l, Montreal	9535 _{ca}	9755 _{ca} 11845 _{ca}
		11940 _{ca}	13720 _{ca}
0100-0200	ABC Brisbane, Australia	4920 _{do}	9660 _{do}
0100-0200	Radio Japan, Tokyo	5960 _{na}	
0100-0200	CFCX Montreal	6005 _{do}	
0100-0200	ABC Perth, Australia	9610 _{do}	
0100-0200	CFRX, Toronto	6070 _{do}	
0100-0200	CBN, Canada	6160 _{do}	
0100-0200	FEBC Radio Int'l, Philippines	15450 _{as}	
0100-0200	Radio Moscow World Service	7370 _{va}	17655 _{va} 17890 _{va}
		21690 _{as}	21790 _{as}
0100-0200	Radio Australia, Melbourne	15160 _{va}	15240 _{va} 15320 _{va}
		17630 _{va}	17715 _{va} 17750 _{va}
		17795 _{va}	21740
0100-0200	Radio Moscow N. American Svc	9530 _{na}	9685 _{na} 9720 _{na}
		11780 _{na}	12040 _{na} 15290 _{na}
		15315 _{na}	12050 _{na} 15425 _{na}
		17600 _{na}	17665 _{na} 17700 _{na}
		21480 _{na}	
0100-0200	R. for Peace Int'l, Costa Rica	7375 _{na}	13630 _{na} 15030 _{na}
		21566 _{na}	
0100-0200	Radio Havana Cuba	15140 _{am}	
0100-0200	Radio New Zealand Int'l	17770 _{pa}	
0100-0200	Radio Thailand, Bangkok	4830 _{as}	9655 _{as} 11905 _{as}
0100-0200 smtwh	RTV Malaysia, Radio 4	7295 _{do}	

0100-0200	SBC Radio 1, Singapore	5052 _{do}	11940 _{do}
0100-0200	WRNO New Orleans, Louisiana	7355 _{na}	
0100-0200	KVOH Los Angeles, California	17775 _{na}	
0100-0200	KTBN Salt Lake City, Utah	7510 _{na}	
0100-0200	Christian Science World Service	7395 _{na}	9850 _{na} 13760 _{na}
		17555 _{na}	17865 _{va}
0100-0200	WYFR Okeechobee, Florida	6065 _{na}	11855 _{na}
		15440 _{na}	
0100-0200	WINB Red Lion, Pennsylvania	15145 _{na}	
0100-0200	WWCR Nashville, Tennessee	7520 _{na}	
0100-0200	BBC London, England	597 _{na}	6005 _{ca} 6175 _{va}
		7325 _{va}	9410 _{eu} 9590 _{va}
		9915 _{va}	11750 _{va} 12095 _{me}
		15260 _{va}	15280 _{va} 15360 _{va}
		21715 _{va}	
0100-0200	Spanish Foreign Radio, Madrid	9630 _{na}	11880 _{na}
0100-0200	HCBJ Quito, Ecuador	9745 _{am}	15155 _{am} 21455 _{am}
		25950 _{am}	
0100-0200	SLBS, Freetown, Sierra Leone	3316 _{do}	
0100-0200	Sri Lanka B'casting Corp.	6005 _{as}	9720 _{as} 15425 _{as}
0100-0200	Voice of America, Washington	6095 _{va}	6125 _{va} 7115 _{as}
		7205 _{as}	11705 _{as} 15160 _{as}
		15250 _{as}	21550 _{as}
0100-0200	Radio Luxembourg	6090 _{om}	
0100-0200	Voice of America, Washington	5995 _{ca}	6130 _{ca} 9455 _{ca}
		9775 _{ca}	9815 _{ca} 11580 _{ca}
		15205 _{ca}	
0100-0200	Voice of Indonesia, Jakarta	11752 _{as}	11785 _{as}
0130-0145 whas	Radio Budapest, Hungary	6110 _{am}	9520 _{am} 9585 _{am}
		9835 _{am}	11910 _{am} 15160 _{am}
0130-0140 mtwhfa	Voice of Greece, Athens	9395 _{am}	9420 _{am} 11645 _{am}
0130-0145 twfa	Radio Budapest, Hungary	6110 _{am}	9520 _{am} 9585 _{am}
		9835 _{am}	11910 _{am} 15160 _{am}
0130-0200	Peace & Progress, Moscow, USSR	11770 _{na}	11860 _{na} 15180 _{na}
		17690 _{na}	17720 _{na}
0130-0200	Radio Austria Int'l, Vienna	9870 _{sa}	9875 _{na} 13730 _{na}
0130-0200	United Arab Emirates R., Dubai	11795 _{na}	13695 _{eu} 15320 _{eu}
		15435 _{eu}	
0130-0200 mwf	Alma Alta Radio, USSR	5035 _{do}	5915 _{do} 6135 _{do}
0130-0200	Radio Tashkent, Alma Ata	7335 _{na}	
0145-0200	Vatican Radio, Vatican City	7125 _{as}	9650 _{as} 11750 _{as}
		11890 _{as}	

SELECTED PROGRAMS**Sundays**

- 0101 BBC: Play Of The Week. Hour-long drama selections from the BBC's crack production team.
- 0105 Christian Science Monitor: Herald of Christian Science. See S 0005.
- 0130 Radio Austria Int'l: Report from Austria. A magazine program, covering all aspects of Austrian life and events in the news, and opening with the latest news bulletin.

Mondays

- 0101 BBC: Feature/Drama. Topical programming on various subjects, or a dramatic production.
- 0106 Christian Science Monitor (Asia): Encore. Features, repeated by popular request.
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0134 Christian Science Monitor (Asia): Letterbox. Staff members respond to listener letters.
- 0145 BBC: Classical Music. "Mastersingers" of the past are the subject through the end of the month.
- 0148 Christian Science Monitor (Asia): Religious Article. A reading from The Christian Science Monitor.

Tuesdays

- 0105 BBC: Outlook. See M 1405.
- 0106 Christian Science Monitor: One Norway Street. See M 2306.
- 0130 BBC: Music. The always-alternating "Folk In Britain" (2nd/16th/30th); "Jazz Now And Then" (9th/23rd).

- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0134 Christian Science Monitor: Letterbox. See M 0134.
- 0145 BBC (South Asia): South Asia Survey. In-depth analysis of political and other developments around the Indian subcontinent.
- 0145 BBC: Health Matters. New medical developments and methods of keeping fit.
- 0148 Christian Science Monitor: Religious Article. See M 0148.

Wednesdays

- 0105 BBC: Outlook. See M 1405.
- 0106 Christian Science Monitor: Curtain Call. See T 2306.
- 0130 BBC: Talks. Brief talks on various subjects.
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0134 Christian Science Monitor: Letterbox. See M 0134.
- 0145 BBC (South Asia): South Asia Survey. See T 0145.
- 0145 BBC: Country Style. David Allan profiles the country music scene on both sides of the pond.
- 0148 Christian Science Monitor: Religious Article. See M 0148.

Thursdays

- 0105 BBC: Outlook. See M 1405.
- 0106 Christian Science Monitor: One Norway Street. See M 2306.
- 0130 BBC: Waveguide. See M 0530.
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0134 Christian Science Monitor: Letterbox. See M 0134.
- 0140 BBC: Book Choice. A short review of a recently released book.

- 0145 BBC (South Asia): South Asia Survey. See T 0145.
- 0145 BBC: The Farming World. Agricultural news and technological innovations for farmers.
- 0148 Christian Science Monitor: Religious Article. See M 0148.

Fridays

- 0105 BBC: Outlook. See M 1405.
- 0106 Christian Science Monitor: Encore. Features, repeated by popular request.
- 0130 BBC: Seven Seas. Malcolm Billings presents news about ships and the sea.
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0134 Christian Science Monitor: Letterbox. See M 0134.
- 0145 BBC (South Asia): South Asia Survey. See T 0145.
- 0145 BBC: Global Concerns. An update on environmental issues.
- 0148 Christian Science Monitor: Religious Article. See M 0148.

Saturdays

- 0105 BBC: Outlook. See M 1405.
- 0106 Christian Science Monitor: Herald of Christian Science. See S 0005.
- 0130 BBC: Short Story (except 6th: "Seeing Stars"). Drama written by BBC listeners.
- 0130 Radio Austria Int'l: Report from Austria. See S 0130.
- 0145 BBC (South Asia): South Asia Survey. See T 0145.
- 0145 BBC: Here's Humph! All that jazz with Humphrey Lyttelton.

0200 UTC**[10:00 PM EDT/7:00 PM PDT]****FREQUENCIES**

0200-0230	FEBC Radio Int'l, Philippines	15450 ^{as}	
0200-0230 sm	Radio Norway, Oslo	15360 ^{na}	
0200-0230	Radio Sweden, Stockholm	9695 ^{na}	11705 ^{na}
0200-0230 s	Radio Budapest, Hungary	6110 ^{am}	9520 ^{am} 9585 ^{am}
		9835 ^{am}	11910 ^{am} 15160 ^{am}
0200-0230	Radio Finland, Helsinki	15185 ^{na}	15430 ^{na}
0200-0230	Sri Lanka B'casting Corp.	6005 ^{as}	9720 ^{as} 15425 ^{as}
0200-0230	Swiss Radio Int'l, Bern	6125 ^{am}	6135 ^{am} 9650 ^{am}
		9885 ^{am}	12035 ^{am} 17730 ^{am}
0200-0230 mtwhf	Voice of America, Washington	5995 ^{ca}	9775 ^{ca} 9815 ^{ca}
		11580 ^{ca}	15205 ^{ca}
0200-0230 mtwhfa	Voice of Kenya, Nairobi	6075 ^{do}	
0200-0250	Deutsche Welle, Koln, Germany	7285 ^{as}	9615 ^{as} 15235 ^{as}
		9690 ^{as}	11945 ^{as} 11965 ^{as}
0200-0300 twhfa	Radio Canada Int'l, Montreal	9535 ^{ca}	9755 ^{ca} 11845 ^{ca}
		11940 ^{ca}	13720 ^{ca}
0200-0300	Radio Cairo, Egypt	9475 ^{na}	9675 ^{na}
0200-0300	Radio Havana Cuba	15140 ^{am}	
0200-0300	ABC Brisbane, Australia	4920 ^{do}	9660 ^{do}
0200-0300	Radio Australia, Melbourne	15160 ^{va}	15240 ^{va} 15320 ^{va}
		17630 ^{va}	17715 ^{va} 17750 ^{va}
		17795 ^{va}	21740
0200-0300 as	KSDA Guam	13720 ^{as}	
0200-0300 twhfa	RAE Buenos Aires, Argentina	11710 ^{na}	
0200-0300	ABC Perth, Australia	9610 ^{do}	
0200-0300	CFRX, Toronto	6070 ^{do}	
0200-0300	CBN, Canada	6160 ^{do}	
0200-0300	Radio Australia, Melbourne	11880 ^{pa}	15160 ^{pa} 15240 ^{as}
		15530 ^{as}	17630 ^{va} 17750 ^{as}
		17795 ^{pa}	17855 ^{va} 21525 ^{va}
		21740 ^{na}	21775 ^{na}
0200-0300	R. for Peace Int'l, Costa Rica	7375 ^{na}	13630 ^{na} 15030 ^{na}
		21566 ^{na}	
0200-0300	HCJB Quito, Ecuador	9745 ^{na}	15155 ^{na} 17875 ^{sa}
0200-0300	WRNO New Orleans, Louisiana	7355 ^{am}	
0200-0300	KTBN Salt Lake City, Utah	7510 ^{am}	
0200-0300	WHRI Noblesville, Indiana	7315 ^{na}	9495 ^{sa}
0200-0300	WINB Red Lion, Pennsylvania	15145 ^{eu}	
0200-0300	WWCR Nashville, Tennessee	7520 ^{na}	
0200-0300	WYFR Okeechobee, Florida	6065 ^{na}	9505 ^{am} 15440 ^{na}

0200-0300	Radio Luxembourg	6090 ^{om}	
0200-0300 m	Radio New York Int'l, (via WWCR)	7435 ^{va}	
0200-0300	Radio New Zealand Int'l	17770 ^{pa}	
0200-0300	BBC London, England	5975 ^{va}	6005 ^{va} 6175 ^{va}
		7325 ^{va}	9410 ^{va} 9515 ^{va}
		9590 ^{va}	9915 ^{va} 11750 ^{va}
		12095 ^{va}	15070 ^{me} 15260 ^{sa}
		21715 ^{pa}	
0200-0300	Radio Romania Int'l, Bucharest	5990 ^{am}	6155 ^{am} 9570 ^{am}
		11830 ^{am}	11940 ^{am} 15380 ^{am}
0200-0300	Radio Thailand, Bangkok	4830 ^{as}	9655 ^{as} 11905 ^{as}
0200-0300 smtwh	RTV Malaysia, Radio 4	7295 ^{do}	
0200-0300	SBC Radio 1, Singapore	5052 ^{do}	11940 ^{do}
0200-0300	SLBS, Freetown, Sierra Leone	3316 ^{do}	
0200-0300	Radio Moscow N. American Svc	9530 ^{na}	9685 ^{na} 9720 ^{na}
		11780 ^{na}	11980 ^{na} 12040 ^{na}
		15290 ^{na}	15315 ^{na} 15540 ^{na}
		15550 ^{na}	17665 ^{na} 17700 ^{na}
		21480 ^{na}	
0200-0300	Radio Cultura, Guatemala	3300 ^{do}	
0200-0300	Radio Moscow World Service	11750 ^{va}	11950 ^{va} 15425 ^{va}
		17590 ^{va}	17665 ^{va} 17775 ^{va}
		17890 ^{va}	21690 ^{va} 21790 ^{va}
0200-0300	Christian Science World Service	9455 ^{eu}	9850 ^{eu} 13760 ^{eu}
		17555 ^{eu}	17865 ^{va}
0200-0300	Voice of America, Washington	7115 ^{as}	7205 ^{as} 11705 ^{as}
		15115 ^{as}	15160 ^{as} 15250 ^{as}
		17740 ^{as}	21550 ^{as}
0200-0300	Voice of Free China, Taiwan	5950 ^{na}	9680 ^{na} 9765 ^{pa}
		11740 ^{ca}	11860 ^{as} 15345 ^{as}
0230-0300	Sri Lanka B'casting Corp.	9720 ^{as}	15425 ^{as}
0230-0245	Radio Pakistan, Islamabad	9545 ^{as}	15115 ^{as} 17640 ^{as}
0230-0300 twhfa	Radio Portugal, Lisbon	9555 ^{sa}	9600 ^{na} 9705 ^{na}
		11840 ^{sa}	
0230-0300	Radio Baghdad, Iraq	11860 ^{na}	
0230-0300	Radio Tirana, Albania	9580 ^{na}	11825 ^{na}
0230-0300 s	Voice of Kenya, Nairobi	6075 ^{do}	
0240-0300	Radio 2, Lusaka, Zambia	6165 ^{do}	7235 ^{do}
0245-0300	Radio Korea, Seoul	15575 ^{va}	
0249-0300	Radio Yerevan, Armenia	11790 ^{na}	13645 ^{na} 15180 ^{na}
		15455 ^{na}	15485 ^{na}
0250-0300	Radio Vaticana	9615 ^{na}	11620 ^{na}

SELECTED PROGRAMS**Sundays**

- 0205 Christian Science Monitor: Herald of Christian Science. See S 0005.
 0208 Swiss Radio Int'l: Dateline. World news, commentary, and analysis of current affairs.
 0218 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. Bob Thomann and Bob Zanotti present DX news and advice.
 0230 BBC: Feature. This month's program is "Taking Issue Around The UK," a discussion series.

Mondays

- 0205 Christian Science Monitor (Americas, Oceania): The Sunday Service. See S 1605.
 0206 Christian Science Monitor (Europe, Africa): News Focus. See M 0006.
 0208 Swiss Radio Int'l: Feature. See S 0638.
 0230 BBC: Composer Of The Month. Profiles of famous composers.
 0234 Christian Science Monitor (Europe, Africa): Home Forum. See M 0034.

Tuesdays

- 0206 Christian Science Monitor: News Focus. See M 0006.
 0208 Swiss Radio Int'l: Dateline. See S 0208.
 0230 BBC: Sports International. Topical features and reports on sports the world over.
 0234 Christian Science Monitor: Kaleidoscope. See M 1634.

Wednesdays

- 0206 Christian Science Monitor: News Focus. See M

36th Anniversary

English Service
Radio Korea

*Radio Korea's
English service as
pictured on a QSL
card sent us by
Franklin Trumpy of
Iowa.*

0006.
 0208 Swiss Radio Int'l: Dateline. See S 0208.
 0230 BBC: Development '91. Aid and development issues for developing nations.
 0234 Christian Science Monitor: Kaleidoscope. See M 1634.

Thursdays

- 0206 Christian Science Monitor: News Focus. See M 0006.
 0208 Swiss Radio Int'l: Dateline. See S 0208.
 0230 BBC: Assignment. An in-depth examination of a topical issue from the news.
 0234 Christian Science Monitor: Kaleidoscope. See M 1634.

Fridays

- 0206 Christian Science Monitor: News Focus. See M 0006.
 0208 Swiss Radio Int'l: Dateline. See S 0208.
 0230 BBC: Drama. See H 1130.
 0234 Christian Science Monitor: Kaleidoscope. See M 1634.

Saturdays

- 0205 Christian Science Monitor: Herald of Christian Science. See S 0005.
 0208 Swiss Radio Int'l: Dateline. See S 0208.
 0230 BBC: People And Politics. The background to the British political scene.

0300 UTC**[11:00 PM EDT/8:00 PM PDT]****FREQUENCIES**

0300-0315	Radio Vaticana	9615na	11620na
0300-0330	Radio Cairo, Egypt	9475na	9675na
0300-0330	Radio Japan, Tokyo	15325na	17825na
		21610na	
0300-0330	Radio Prague, Czechoslovakia	5930na	7345na 9540na
0300-0330	Voice of America, Washington	6095va	15160va 15195va
		17810va	17865va
0300-0350	Deutsche Welle, Koln, Germany	6085na	6145na 9545na
		11810na	11890na 13610na
		13770na	15205na 15425na
0300-0400	Radio 2, Lusaka, Zambia	6165do	7235do
0300-0400	Radio Moscow World Service	11780na	11850na 11980na
		12055as	15140as 15280eu
		15420eu	15425as 17560as
		17590as	17600eu 17605as
		17620as	17730eu 21570pa
		21690as	21790as 21845af
0300-0400	Radio Baghdad, Iraq	11860na	
0300-0400	Radio Beijing, China	9690am	9770am 11715am
0300-0400	Radio Havana Cuba	15140am	
0300-0400	CFCX Montreal	6005do	
0300-0400	BBC London, England	5975va	6005va 6175va
		6195va	7325va 9410va
		9600af	9915eu 11750va
		11955pa	12095eu 15070va
		15260na	15420af 15590pa
0300-0400	Radio Luxembourg	15350om	
0300-0400	ABC Brisbane, Australia	4920do	9660do
0300-0400	Radio Luxembourg	15350om	
0300-0400	Voice of Turkey, Ankara	9445na	17760as
0300-0400	Radio Sofia, Bulgaria	11720na	15160af 15290na
		15310af	17825af
0300-0400	Radio Australia, Melbourne	15160va	15240va 15320va
		17630va	17715va 17750va
		17795va	21740pa 21775pa

0300-0400	ABC Perth, Australia	9610do	
0300-0400	CFRX Toronto	6070do	
0300-0400	CBN, Canada	6160do	
0300-0400	Radio New Zealand Int'l	17770pa	
0300-0400	R. Peace Int'l, Costa Rica	7375na	13630na 15030na
		21566na	
0300-0400	Radio Tanzania, Dar es Salaam	5985af	9685af 11765af
0300-0400	Radio Thailand, Bangkok	4830as	9655as 11905as
0300-0400	HCJB Quito, Ecuador	9745na	15155na 21545na
0300-0400	KVOH Los Angeles	9785na	
0300-0400	Voice of Free China, Taiwan	5950na	9680na
0300-0400	WRNO New Orleans, Louisiana	7355am	
0300-0400	KTBN Salt Lake City, Utah	7510am	
0300-0400	WHRI Noblesville, Indiana	7315na	9495sa
0300-0400	Christian Science World Service	9455na	9850na 13760na
		17555na	17865va
0300-0400	Radio Cultura, Guatemala	3300do	
0300-0400	WWCR Nashville, Tennessee	7520na	
0300-0400	WYFR Okeechobee, Florida	6065na	9505na
0300-0400	Trans World Radio Boniare	9535am	11930am
0300-0400	smtwh RTV Malaysia, Radio 4	7295do	
0300-0400	SBC Radio 1, Singapore	5052do	11940do
0300-0400	SLBS, Freetown, Sierra Leone	3316do	
0300-0400	Sri Lanka B'casting Corp.	9720as	15425as
0300-0400	Voice of America, Washington	6035af	9575af 11835af
		15115af	17715af 21600af
0300-0400	Voice of Kenya, Nairobi	6075do	
0310-0325	Vatican Radio, Vatican City	9635na	
0325-0400	mtwhfa Zimbabwe BC Corp., Harare	3396do	
0330-0400	Radio Netherlands, Hilversum	6165am	9590am
0330-0400	Radio Sweden, Stockholm	9695na	11705na
0330-0400	Radio Tirana, Albania	9760na	11825na
0330-0400	UAE Radio, Dubai	11945na	13675na 15400na
		15435na	
0340-0350	mtwhfa Voice of Greece, Athens	9395am	9420am 11645am
0350-0400	RAI, Rome, Italy	11905as	15330as 17795as

SELECTED PROGRAMS**Sundays**

- 0305 Christian Science Monitor: Herald of Christian Science. See S 0005.
- 0315 BBC: Recording Of The Week. A personal choice from the new classical music releases.
- 0330 BBC: From Our Own Correspondent. Reporters comment on the background to the news.
- 0335 BBC (Africa): Postmark Africa. Answers to any question under the sun.
- 0350 BBC: Write On. Listener letters, opinions, and questions.

Mondays

- 0306 Christian Science Monitor (Europe, Africa): Encore. See M 0106.
- 0315 BBC: Good Books. Recommendations of books to read.
- 0330 BBC: Anything Goes. See S 1430.
- 0334 Christian Science Monitor (Europe, Africa): Letterbox. See M 0134.
- 0335 BBC (Africa): Network Africa. Hilton Fyle and the team present information, personalities, and music.
- 0348 Christian Science Monitor (Europe, Africa): Religious Article. See M 0148.

Tuesdays

- 0306 Christian Science Monitor: One Norway Street. See M 2306.
- 0315 BBC: The World Today. See M 1645.
- 0330 BBC: John Peel. Newly released albums and singles from the contemporary music scene.
- 0334 Christian Science Monitor: Letterbox. See M 0134.
- 0335 BBC (Africa): Network Africa. See M 0335.
- 0348 Christian Science Monitor: Religious Article. See M 0148.

Wednesdays

- 0306 Christian Science Monitor: Curtain Call. See T 2306.
- 0315 BBC: The World Today. See M 1645.
- 0330 BBC: Discovery. An in-depth look at scientific research.
- 0334 Christian Science Monitor: Letterbox. See M 0134.
- 0335 BBC (Africa): Network Africa. See M 0335.
- 0348 Christian Science Monitor: Religious Article. See M 0148.

Thursdays

- 0306 Christian Science Monitor: One Norway Street. See M 2306.
- 0315 BBC: The World Today. See M 1645.
- 0330 BBC: Quiz. See M 1215.
- 0334 Christian Science Monitor: Letterbox. See M 0134.
- 0335 BBC (Africa): Network Africa. See M 0335.
- 0348 Christian Science Monitor: Religious Article. See M 0148.

Fridays

- 0306 Christian Science Monitor: One Norway Street. See M 2306.
- 0315 BBC: The World Today. See M 1645.
- 0330 BBC: Focus On Faith. Comment and discussion on major issues in various religions.
- 0334 Christian Science Monitor: Letterbox. See M 0134.
- 0335 BBC (Africa): Network Africa. See M 0335.
- 0348 Christian Science Monitor: Religious Article. See M 0148.

Saturdays

- 0305 Christian Science Monitor: Herald of Christian Science. See S 0005.
- 0315 BBC: The World Today. See M 1645.
- 0330 BBC: The Vintage Chart Show. Paul Burnett with past Top 20 pop music hits.

0335 BBC (Africa): Saturdays Only. The Saturday edition of "Focus On Africa," with discussions on current events and interviews.



Two staff members in the studios of the Christian Science World Service.

0400 UTC**[12:00 AM EDT/9:00 PM PDT]****FREQUENCIES**

0400-0410	RAI, Rome, Italy	11905 ^{as}	15330 ^{as}	17795 ^{as}
0400-0415	Kol Israel, Jerusalem	9435 ^{na}	11588 ^{na}	11655 ^{na}
		15640 ^{ca}	17575 ^{as}	17590 ^{na}
0400-0415	Radio Prague, Czechoslovakia	5930 ^{na}	7345 ^{na}	9540 ^{na}
0400-0425	Radio Cultura, Guatemala	3300 ^{do}		
0400-0425	Radio Netherlands, Hilversum	6165 ^{am}	9590 ^{am}	
0400-0430 sm	Radio Norway, Oslo	11865 ^{na}		
0400-0430	Radio Canada Int'l, Montreal	15275 ^{me}		
0400-0430	Voice of America	5995 ^{eu}	6040 ^{eu}	6140 ^{eu}
		7170 ^{eu}	7200 ^{eu}	11825 ^{eu}
		15115 ^{eu}	15205 ^{eu}	
0400-0430	Radio Baghdad, Iraq	11860 ^{na}		
0400-0430	Radio Romania Int'l, Bucharest	5990 ^{am}	9510 ^{am}	9570 ^{am}
		11830 ^{am}	11940 ^{am}	15380 ^{am}
0400-0430	Trans World Radio, Bonaire	9535 ^{am}	11930 ^{am}	
0400-0430	Radio Tanzania, Dar es Salaam	5985 ^{af}	9685 ^{af}	11765 ^{af}
0400-0430	Radio Thailand, Bangkok	4830 ^{as}	9655 ^{as}	11905 ^{as}
0400-0430	Sri Lanka B'casting Corp.	9720 ^{as}	15425 ^{as}	
0400-0430	Swiss Radio Int'l, Bern	6135 ^{am}	9650 ^{am}	9885 ^{am}
		12035 ^{am}		
0400-0430	Voice of America, Washington	6035 ^{af}	9575 ^{af}	11835 ^{af}
		15350 ^{af}	17715 ^{af}	21600 ^{af}
0400-0450	Deutsche Welle, Koln, Germany	6145 ^{af}	7150 ^{af}	7225 ^{af}
		9565 ^{af}	9765 ^{af}	11765 ^{af}
		11890 ^{af}	13610 ^{af}	13770 ^{af}
		15425 ^{af}		
0400-0450	Radio Havana Cuba	5965 ^{va}	9505 ^{am}	9750 ^{am}
		11760 ^{am}	11950 ^{na}	
0400-0500	R. for Peace Int'l, Costa Rica	7375 ^{na}	13630 ^{na}	15030 ^{na}
		21566 ^{na}		
0400-0500	BBC London, England	5975 ^{va}	6175 ^{va}	6195 ^{va}
		7120 ^{va}	9410 ^{va}	9600 ^{va}
		9610 ^{va}	9915 ^{va}	12095 ^{va}
		15070 ^{va}	15280 ^{va}	15400 ^{va}
		15420 ^{va}		
0400-0500	Radio Moscow North Am Svc	15425 ^{na}		
0400-0500	CFCX Montreal	6005 ^{do}		
0400-0500	Radio Cultura, Guatemala	3300 ^{do}		
0400-0500	ABC Brisbane, Australia	4920 ^{do}	9660 ^{do}	
0400-0500	ABC Perth, Australia	9610 ^{do}		
0400-0500	CFRX, Toronto	6070 ^{do}		
0400-0500	CBN, Canada	6160 ^{do}		

0400-0500	Radio 2, Lusaka, Zambia	6165 ^{do}	7235 ^{do}	
0400-0500	Radio Beijing, China	11685 ^{am}	11840 ^{am}	
0400-0500	Radio Moscow World Service	9720 ^{na}	11780 ^{eu}	11850 ^{na}
		21635 ^{as}	21690 ^{eu}	
0400-0500	HCJB Quito, Ecuador	9745 ^{na}	15155 ^{na}	
0400-0500	WRNO New Orleans, Louisiana	6185 ^{am}		
0400-0500	KVOH Los Angeles, California	9785 ^{am}		
0400-0500	KTBN Salt Lake City, Utah	7510 ^{am}		
0400-0500	WHRI Noblesville, Indiana	7315 ^{na}	9495 ^{sa}	
0400-0500	Radio Australia, Melbourne	15320 ^{va}	15530 ^{va}	17630 ^{va}
		17715 ^{va}	17795 ^{va}	21525 ^{va}
		21775 ^{va}		
0400-0500	Christian Science World Service	9455 ^{na}	9840 ^{af}	13760 ^{na}
		17555 ^{as}	17780 ^{as}	
0400-0500	WWCR Nashville, Tennessee	7520 ^{na}		
0400-0500	WYFR Okeechobee, Florida	6065 ^{na}	9505 ^{na}	
0400-0500	Radio Luxembourg	15350 ^{om}		
0400-0500 smtwhf	Radio New Zealand Int'l	17770 ^{pa}		
0400-0500	Radio Pyongyang, North Korea	15180 ^{as}	15230 ^{as}	17765 ^{as}
0400-0500	Radio RSA, South Africa	7270 ^{af}	11900 ^{af}	11920 ^{af}
0400-0500 smtwh	RTV Malaysia, Radio 4	7295 ^{do}		
0400-0500	SBC Radio 1, Singapore	5052 ^{do}	11940 ^{do}	
0400-0500	SLBS, Freetown, Sierra Leone	3316 ^{do}		
0400-0500	Voice of America, Washington	5995 ^{va}	6140 ^{va}	7170 ^{va}
		7200 ^{va}	9715 ^{va}	
0400-0500	Voice of Kenya, Nairobi	6075 ^{do}		
0400-0430	Trans World Radio, Bonaire	9535 ^{am}	11930 ^{am}	
0400-0500	Radio Canada Int'l, Montreal	11925 ^{as}		
0400-0500 smtwhf	WMLK Bethel, PA	9465 ^{eu}		
0400-0500 mtwhfa	Zimbabwe BC Corp., Harare	3390 ^{do}		
0400-0425	RAI, Rome, Italy	5990 ^{me}	7275 ^{me}	
0430-0500	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}	
0430-0500 mtwhf	Radio Southwest Africa, Namibia	3270 ^{af}	3290 ^{af}	
0430-0500	Radio Tirana, Albania	9480 ^{af}	11835 ^{af}	
0430-0500 s	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af}	17895 ^{af}
0430-0500	TWR Swaziland	5055 ^{af}	5965 ^{af}	9655 ^{af}
		11750 ^{af}		
0430-0500	Voice of America	3980 ^{eu}	5995 ^{eu}	6040 ^{eu}
		6140 ^{eu}	7170 ^{eu}	7200 ^{eu}
		11825 ^{eu}	15205 ^{eu}	
0430-0500	Voice of America, Washington	6035 ^{af}	9575 ^{af}	15115 ^{af}
		17715 ^{af}	21600 ^{af}	
0432-0500	FEBA Seychelles	17810 ^{me}		
0450-0500	Radio Havana Cuba	9750 ^{am}	11760 ^{am}	11950 ^{na}

SELECTED PROGRAMS**Sundays**

- 0405 Christian Science Monitor: Herald of Christian Science. See S 0005.
- 0408 Swiss Radio Int'l: Dateline. See S 0208.
- 0418 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.
- 0430 BBC (Africa): African Perspective. A look at a major issue affecting Africa.
- 0430 BBC: Pop Music. This month features the return of "Stuart Colman's Record Hop."
- 0445 BBC: Talks. Education worldwide is the focus of "The Learning World" (through 21st), with a new series of talks beginning on the 28th.

Mondays

- 0405 Christian Science Monitor (Americas, Oceania): The Sunday Service. See S 1605.
- 0406 Christian Science Monitor (Europe, Africa, NE Asia): News Focus. See M 0006.
- 0408 Swiss Radio Int'l: Feature. See S 0638.
- 0430 BBC (Africa): Focus On Africa. African politics, sports, economics, medicine, and media.
- 0430 BBC: Off The Shelf. Serialized readings from some of the world's great books.
- 0434 Christian Science Monitor (Europe, Africa, NE Asia): Home Forum. See M 0034.
- 0445 BBC: Andy Kershaw's World Of Music. Exotic music from the world over.

Tuesdays

- 0406 Christian Science Monitor: News Focus. See M

0006.

- 0408 Swiss Radio Int'l: Dateline. See S 0208.
- 0430 BBC (Africa): Focus On Africa. See M 0430.
- 0430 BBC: Off The Shelf. See M 0430.
- 0434 Christian Science Monitor: Kaleidoscope. See M 1634.
- 0445 BBC: Europe's World. Life in Europe and its links with the rest of the world.

Wednesdays

- 0406 Christian Science Monitor: News Focus. See M 0006.
- 0408 Swiss Radio Int'l: Dateline. See S 0208.
- 0430 BBC (Africa): Focus On Africa. See M 0430.
- 0430 BBC: Off The Shelf. See M 0430.



Keith Somerville, regular host of the BBC Current Affairs feature.

- 0434 Christian Science Monitor: Kaleidoscope. See M 1634.
- 0445 BBC: Country Style. See W 0145.

Thursdays

- 0406 Christian Science Monitor: News Focus. See M 0006.
- 0408 Swiss Radio Int'l: Dateline. See S 0208.
- 0430 BBC (Africa): Focus On Africa. See M 0430.
- 0430 BBC: Off The Shelf. See M 0430.
- 0434 Christian Science Monitor: Kaleidoscope. See M 1634.
- 0445 BBC: From Our Own Correspondent. See S 0330.

Fridays

- 0406 Christian Science Monitor: News Focus. See M 0006.
- 0408 Swiss Radio Int'l: Dateline. See S 0208.
- 0430 BBC (Africa): Focus On Africa. See M 0430.
- 0430 BBC: Off The Shelf. See M 0430.
- 0434 Christian Science Monitor: Kaleidoscope. See M 1634.
- 0445 BBC: Music. See T 0130.

Saturdays

- 0405 Christian Science Monitor: Herald of Christian Science. See S 0005.
- 0408 Swiss Radio Int'l: Dateline. See S 0208.
- 0430 BBC (Africa): Spice Taxi. A look at African culture. Just what is a spice taxi?
- 0430 BBC: Here's Humph! See A 0145.
- 0445 BBC: Worldbrief. See F 2315.

0500 UTC**[1:00 AM EDT/10:00 PM PDT]****FREQUENCIES**

0500-0510	Radio Lesotho, Maseru	4800 ^{do}	
0500-0510 w	Malawi B'casting Corp., Blantyre	3381 ^{do}	
0500-0530	CRTV Buea, Cameroon	3970 ^{do}	
0500-0530	Voice of America	3980 ^{eu}	5995 ^{eu} 6040 ^{eu}
		6140 ^{eu}	7170 ^{eu} 7200 ^{eu}
		11825 ^{eu}	15205 ^{eu}
0500-0530	TWR Swaziland	5965 ^{af}	9655 ^{af} 11750 ^{af}
0500-0530	Vatican Radio, Vatican City	6185 ^{eu}	6248 ^{eu} 17710 ^{af}
		17730 ^{af}	21650 ^{af}
0500-0530 mtwhfa	Zimbabwe BC Corp., Harare	3396 ^{do}	
0500-0550	Deutsche Welle, Köln, Germany	5960 ^{na}	6120 ^{na} 9760 ^{na}
		9700 ^{na}	11890 ^{na} 13610 ^{na}
		11705 ^{na}	13790 ^{na}
0500-0600	Christian Science World Service	9455 ^{eu}	9840 ^{eu} 13760 ^{eu}
		17555 ^{eu}	17780 ^{va}
0500-0600	CFCX Montreal	6005 ^{do}	
0500-0600	Radio 2, Lusaka, Zambia	6165 ^{do}	7235 ^{do}
0500-0600	Radio New Zealand Int'l	17770 ^{pa}	
0500-0600	Spanish Foreign Radio, Madrid	9630 ^{na}	
0500-0600	Radio Beijing, China	11840 ^{am}	
0500-0600 sa	Radio E.Africa, Equatorial Guinea	9585 ^{af}	
0500-0600	Radio Havana Cuba	5965 ^{va}	9750 ^{am} 11760 ^{am}
		11950 ^{na}	
0500-0600	Radio Luxembourg	15350 ^{om}	
0500-0600 m	Radio New York Intl (via WWCR)	7435 ^{va}	
0500-0600	Radio Moscow World Service	9720 ^{na}	11780 ^{eu} 11850 ^{na}
		11980 ^{as}	15280 ^{eu}
0500-0600	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}
0500-0600 mtwhf	Radio Southwest Africa, Namibia	3270 ^{af}	3290 ^{af}
0500-0600	Radio Japan, Tokyo	17765 ^{na}	17810 ^{na} 17825 ^{na}
		17890 ^{na}	21610 ^{na}
0500-0600	HCJB Quito, Ecuador	9745 ^{na}	15155 ^{na}
0500-0600	WRNO New Orleans, Louisiana	6185 ^{am}	
0500-0600	KTN Salt Lake City, Utah	7510 ^{am}	
0500-0600	ABC Brisbane, Australia	4920 ^{do}	9660 ^{do}
0500-0600	ABC Perth, Australia	9610 ^{do}	
0500-0600	R. for Peace Int'l, Costa Rica	7375 ^{na}	13630 ^{na} 15030 ^{na}
		21566 ^{na}	
0500-0600	CFRX, Toronto	6070 ^{do}	
0500-0600	CBN, Canada	6160 ^{do}	
0500-0600	KVOH Los Angeles, California	9785 ^{am}	
0500-0600	WHRI Noblesville, Indiana	7315 ^{sa}	9495 ^{sa}
0500-0600	WINB Red Lion, Pennsylvania	15145 ^{eu}	
0500-0600	WWCR Nashville, Tennessee	7520 ^{na}	
0500-0600	Radio Australia, Melbourne	15320 ^{va}	15530 ^{va} 17630 ^{va}

0500-0600	WYFR Okeechobee, Florida	5985 ^{na}	11580 ^{am} 15566 ^{eu}
0500-0600	Radio Thailand, Bangkok	4830 ^{as}	9655 ^{as} 11905 ^{as}
0500-0600 s	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af} 17895 ^{af}
0500-0600	RTV Malaysia, Radio 4	7295 ^{do}	
0500-0600	SBC Radio 1, Singapore	5052 ^{do}	11940 ^{do}
0500-0600	SLBS, Freetown, Sierra Leone	3316 ^{do}	
0500-0600	Voice of America, Washington	6035 ^{af}	9575 ^{af} 15115 ^{af}
		17715 ^{af}	
0500-0600	Voice of America, Washington	5995 ^{va}	6060 ^{va} 6140 ^{va}
		7170 ^{va}	7200 ^{va} 9670 ^{va}
		9700 ^{va}	9715 ^{va} 11825 ^{va}
		15205 ^{va}	
0500-0600	BBC London, England	3955 ^{va}	5975 ^{va} 6005 ^{va}
		6180 ^{va}	6190 ^{va} 6195 ^{va}
		7120 ^{va}	7230 ^{va} 9410 ^{va}
		9600 ^{af}	9640 ^{af} 9915 ^{na}
		11760 ^{eu}	11940 ^{af} 12095 ^{pa}
		15070 ^{eu}	15280 ^{pa} 15310 ^{me}
		15400 ^{af}	15420 ^{af} 15590 ^{me}
		21715 ^{af}	
0500-0600	Voice of Kenya, Nairobi	6075 ^{do}	
0500-0600	Voice of Nigeria, Lagos	7255 ^{af}	
0510-0515 w	Radio Botswana, Gaborone	5955 ^{af}	7255 ^{af}
0515-0600 mtwhf	Radio Canada Int'l, Montreal	6050 ^{eu}	6150 ^{eu} 7295 ^{eu}
		9750 ^{eu}	11775 ^{eu} 17840 ^{eu}
0524-0600 f	Radio 2, Accra, Ghana	3366 ^{do}	
0526-0600	Radio 1, Accra, Ghana ¹	4915 ^{do}	
0530-0545	BBC English by Radio, London	6050 ^{eu}	7210 ^{eu} 9750 ^{eu}
0530-0600	Radio Tirana, Albania	7205 ^{eu}	9500 ^{eu}
0530-0600	Voice of America	3980 ^{eu}	5995 ^{eu} 6040 ^{eu}
		6060 ^{eu}	6140 ^{eu} 7170 ^{eu}
		7200 ^{eu}	11825 ^{eu} 15205 ^{eu}
0530-0600	Cameroon Radio-TV, Yaounde	4850 ^{do}	
0530-0600	Radio Austria Int'l, Vienna	6015 ^{na}	6155 ^{eu} 13730 ^{eu}
		15410 ^{me}	21490 ^{me}
0530-0600	Guizhou PBS, Guiyang, China ⁴	3260 ^{do}	7275 ^{do}
0530-0600	Radio Romania Int'l, Bucharest	15340 ^{af}	15380 ^{af} 17720 ^{af}
		17745 ^{af}	17790 ^{af} 21665 ^{af}
0530-0600	UAE Radio, Dubai,	15435 ^{as}	17830 ^{as} 17865 ^{as}
		21700 ^{as}	
0530-0600	United Arab Emirates		
0530-0600	TWR Swaziland	5965 ^{af}	11750 ^{af}
0530-0600 mtwhfa	Zimbabwe BC Corp, Harare	3396 ^{do}	7283 ^{do}
0545-0600	Radio Buea, Cameroon ¹	3970 ^{do}	
0555-0600	Voice of Malaysia, Kuala Lumpur	6175 ^{as}	9750 ^{as} 15295 ^{as}

SELECTED PROGRAMS**Sundays**

0505 Christian Science Monitor: Herald of Christian Science. See S 0005.
 0509 BBC: Twenty-Four Hours. Analysis of the main news of the day.
 0530 BBC: World Business Review. The previous week's news and upcoming events.
 0530 Radio Austria Int'l: Report from Austria. See S 0130.
 0535 BBC (Africa): Postmark Africa. See S 0335.
 0540 BBC: Words Of Faith. Speakers from various faiths discuss scripture and their beliefs.
 0545 BBC: Letter From America. Alistair Cooke presents his unique reflections on the USA.

Mondays

0506 Christian Science Monitor (Europe, Africa, NE Asia): Encore. See M 0106.
 0509 BBC: Twenty-Four Hours. See S 0509.
 0530 BBC: Waveguide. Tips on how to hear the BBC better.
 0530 Radio Austria Int'l: Report from Austria. See S 0130.
 0534 Christian Science Monitor (Europe, Africa, NE Asia): Letterbox. See M 0134.
 0535 BBC (Africa): Network Africa. See M 0335.
 0540 BBC: Words Of Faith. See S 0540.
 0545 BBC: Recording Of The Week. See S 0315.
 0548 Christian Science Monitor (Europe, Africa, NE Asia): Religious Article. See M 0148.

Tuesdays

0506 Christian Science Monitor: One Norway Street. See M 2306.
 0509 BBC: Twenty-Four Hours. See S 0509.
 0530 BBC: World Business Report. See M 2305.
 0530 Radio Austria Int'l: Report from Austria. See S 0130.
 0534 Christian Science Monitor: Letterbox. See M 0134.
 0535 BBC (Africa): Network Africa. See M 0335.
 0540 BBC: Words Of Faith. See S 0540.
 0545 BBC: The World Today. See M 1645.
 0548 Christian Science Monitor: Religious Article. See M 0148.

Wednesdays

0506 Christian Science Monitor: Curtain Call. See T 2306.
 0509 BBC: Twenty-Four Hours. See S 0509.
 0530 BBC: World Business Report. See M 2305.
 0530 Radio Austria Int'l: Report from Austria. See S 0130.
 0534 Christian Science Monitor: Letterbox. See M 0134.
 0535 BBC (Africa): Network Africa. See M 0335.
 0540 BBC: Words Of Faith. See S 0540.
 0545 BBC: The World Today. See M 1645.
 0548 Christian Science Monitor: Religious Article. See M 0148.

Thursdays

0506 Christian Science Monitor: One Norway Street. See M 2306.
 0509 BBC: Twenty-Four Hours. See S 0509.
 0530 BBC: World Business Report. See M 2305.
 0530 Radio Austria Int'l: Report from Austria. See S

0130.

0534 Christian Science Monitor: Letterbox. See M 0134.
 0535 BBC (Africa): Network Africa. See M 0335.
 0540 BBC: Words Of Faith. See S 0540.
 0545 BBC: The World Today. See M 1645.
 0548 Christian Science Monitor: Religious Article. See M 0148.

Fridays

0506 Christian Science Monitor: One Norway Street. See M 2306.
 0509 BBC: Twenty-Four Hours. See S 0509.
 0530 BBC: World Business Report. See M 2305.
 0530 Radio Austria Int'l: Report from Austria. See S 0130.
 0534 Christian Science Monitor: Letterbox. See M 0134.
 0535 BBC (Africa): Network Africa. See M 0335.
 0540 BBC: Words Of Faith. See S 0540.
 0545 BBC: The World Today. See M 1645.
 0548 Christian Science Monitor: Religious Article. See M 0148.

Saturdays

0505 Christian Science Monitor: Herald of Christian Science. See S 0005.
 0509 BBC: Twenty-Four Hours. See S 0509.
 0530 BBC: World Business Report. See M 2305.
 0530 Radio Austria Int'l: Report from Austria. See S 0130.
 0535 BBC (Africa): Saturdays Only. See A 0335.
 0540 BBC: Words Of Faith. See S 0540.
 0545 BBC: The World Today. See M 1645.

0600 UTC**[2:00 AM EDT/11:00 PM PDT]****FREQUENCIES**

0600-0610 s	Malawi B'casting Corp., Blantyre	3381 ^{do}		
0600-0620	Vatican Radio, Vatican City	6185 ^{eu}	6248 ^{eu}	
0600-0625	Cameroon Radio-TV, Yaounde	4850 ^{do}		
0600-0625	Voice of Kenya, Nairobi	6075 ^{do}		
0600-0630 s	ZLXA New Zealand	3935 ^{do}		
0600-0630	Nat'l Radio of Laos, Vientiane	7112 ^{as}		
0600-0630 s	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af}	17895 ^{af}
0600-0645 s	Radio Douala, Cameroon	4795 ^{do}		
0600-0650	Deutsche Welle, Koln, Germany	11765 ^{af}	13610 ^{af}	13790 ^{af}
		15185 ^{af}	15205 ^{af}	17875 ^{af}
0600-0700	King of Hope, Lebanon	6280 ^{me}		
0600-0700	Radio 1, Accra, Ghana ¹	4915 ^{do}		
0600-0700 f	Radio 2, Accra, Ghana	3366 ^{do}		
0600-0700	Radio 2, Lusaka, Zambia	6165 ^{do}	7235 ^{do}	
0600-0700 sa	Radio E.Africa, Equatorial Guinea	9585 ^{af}		
0600-0700	Radio New Zealand Int'l	17770 ^{pa}		
0600-0700	Radio Havana Cuba	11835 ^{am}		
0600-0700	Radio Luxembourg	15350 ^{om}		
0600-0700	Radio Australia, Melbourne	9640 ^{pa}	11930 ^{pa}	15240 ^{as}
		15320 ^{pa}	17630 ^{as}	17750 ^{af}
		21525 ^{na}	21740 ^{na}	21775 ^{pa}
0600-0700	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}	
0600-0700	Radio Pyongyang, North Korea	15180 ^{as}	15230 ^{as}	
0600-0700 sa	Radio Thailand, Bangkok	4830 ^{as}	9655 ^{as}	11905 ^{as}
0600-0700 smtwha	RTV Malaysia, Radio 4	7295 ^{do}		
0600-0700	SBC Radio 1, Singapore	5052 ^{do}	11940 ^{do}	
0600-0700	SLBS, Freetown, Sierra Leone	3316 ^{do}		
0600-0700	BBC London, England	3955 ^{eu}	6180 ^{na}	6190 ^{as}
		6195 ^{as}	7120 ^{pa}	7230 ^{af}
		9410 ^{af}	9600 ^{af}	11760 ^{eu}
		11940 ^{eu}	12095 ^{af}	15070 ^{af}
		15310 ^{as}	15400 ^{af}	15420 ^{af}
		15590 ^{me}	17885 ^{me}	21470 ^{af}
0600-0700	Radio Moscow N. American Svc	17720 ^{na}		
0600-0700	Radio Moscow World Service	7310 ^{na}	12055 ^{va}	13705 ^{va}
		15280 ^{va}	15295 ^{va}	15455 ^{va}

0600-0700	Radio Korea, Seoul	15560 ^{va}	17570 ^{va}	17590 ^{va}
0600-0700	V. of the Mediterranean, Malta	17600 ^{va}	17610 ^{va}	17675 ^{va}
0600-0700	Christian Science World Service	72750 ^{om}	11810 ^{na}	15170 ^{na}
		9765 ^{eu}		
0600-0700	WYFR Okeechobee, Florida	9455 ^{eu}	9840 ^{eu}	11705 ^{na}
		17555 ^{eu}	17780 ^{va}	
0600-0700	VOA Europe	5985 ^{na}	7355 ^{eu}	13760 ^{na}
		15566 ^{eu}		
0600-0700	WHRI Noblesville, Indiana	3980 ^{eu}	5995 ^{eu}	6040 ^{eu}
0600-0700	HCJB Quito, Ecuador	6060 ^{eu}	6095 ^{eu}	6140 ^{eu}
0600-0700	WWCR Nashville, Tennessee	7170 ^{eu}	7325 ^{eu}	11805 ^{eu}
0600-0700 smtwhf	WMLK Bethel, Pennsylvania	7315 ^{eu}	9495 ^{sa}	
0600-0700	KTBN Salt Lake City, Utah	9745 ^{na}	15115 ^{na}	
0600-0700	TWR SWaziland	7520 ^{na}		
0600-0700	CFRX Toronto	9465 ^{eu}		
0600-0700	CFCX Montreal	7510 ^{na}		
0600-0700	R. For Peace Int'l, Costa Rica	5965 ^{af}	7200 ^{af}	11750 ^{af}
		6070 ^{do}		
		6005 ^{do}		
0600-0700	Voice of America, Washington	7375 ^{na}	13630 ^{na}	15030 ^{na}
		21566 ^{na}		
0600-0700	Voice of Malaysia, Kuala Lumpur	6035 ^{af}	6125 ^{af}	9530 ^{af}
0600-0700	Zimbabwe BC Corp, Harare	9575 ^{af}	15115 ^{af}	17715 ^{af}
0615-0630 s	Radio Bertoua, Cameroon	6175 ^{as}	9750 ^{as}	15295 ^{as}
0625-0700	Voice of Kenya, Nairobi	3396 ^{do}	7283 ^{do}	
0630-0635 mtwhf	RTV Congolaise, Brazzaville	4750 ^{do}		
0630-0700	Radio Polonia, Warsaw	7140 ^{do}		
		7105 ^{do}	9610 ^{do}	
		6135 ^{eu}	7270 ^{eu}	9675 ^{eu}
0630-0700	Radio Tirana, Albania	15120 ^{eu}		
0630-0700	BRT Brussels, Belgium	7205 ^{eu}	9500 ^{eu}	
0630-0700	Radio Sofia, Bulgaria	6035 ^{eu}	11695 ^{eu}	13675 ^{eu}
0630-0700	Radio Finland, Helsinki	11720 ^{eu}	15160 ^{eu}	17825 ^{eu}
0630-0700	Swiss Radio Int'l, Bern	6120 ^{eu}	9560 ^{eu}	11755 ^{eu}
0630-0700 smtwhf	ZLXA New Zealand	15430 ^{af}	17570 ^{af}	21770 ^{af}
0630-0700	Vatican Radio, Vatican City	3935 ^{do}		
0635-0700	Trans World Radio, Monte Carlo	11710 ^{af}	17730 ^{af}	21650 ^{af}
0645-0700	Ghana B'casting Corp., Accra	9480 ^{eu}		
		6130 ^{af}		

SELECTED PROGRAMS**Sundays**

- 0605 Christian Science Monitor: Herald of Christian Science. See S 0005.
 0635 BBC: Jazz For The Asking. Digby Fairweather plays listener requests.
 0635 BBC (Africa): Postmark Africa. See S 0335.
 0638 Swiss Radio Int'l: Feature. Programs broadcast on a rotating basis are "The Grapevine" (listener comment), "Supplement" (news analysis), and "Roundabout Switzerland" (travel/discovery).

Mondays

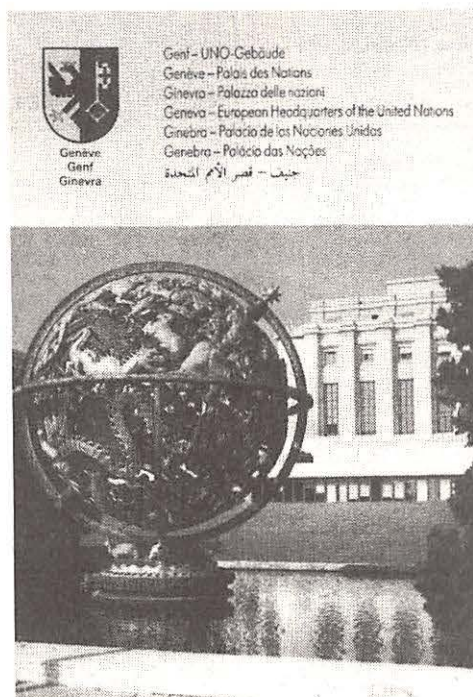
- 0606 Christian Science Monitor: News Focus. See M 0006.
 0630 BBC: Feature. See S 1401.
 0634 Christian Science Monitor: Home Forum. See M 0034.
 0635 BBC (Africa): Network Africa. See M 0335.
 0638 Swiss Radio Int'l: Dateline. See S 0208.

Tuesdays

- 0606 Christian Science Monitor: News Focus. See M 0006.
 0630 BBC: Rock/Pop Music. A topical feature on various musical subjects.
 0634 Christian Science Monitor: Kaleidoscope. See M 1634.
 0635 BBC (Africa): Network Africa. See M 0335.
 0638 Swiss Radio Int'l: Dateline. See S 0208.

Wednesdays

- 0606 Christian Science Monitor: News Focus. See M 0006.



Swiss Radio International QSL from
Donald M. Choleva of Ohio

- 0630 BBC: Meridian. Events in the world of the arts.
 0634 Christian Science Monitor: Kaleidoscope. See M 1634.
 0635 BBC (Africa): Network Africa. See M 0335.
 0638 Swiss Radio Int'l: Dateline. See S 0208.

Thursdays

- 0606 Christian Science Monitor: News Focus. See M 0006.
 0630 BBC: Omnibus. See W 0030.
 0634 Christian Science Monitor: Kaleidoscope. See M 1634.
 0635 BBC (Africa): Network Africa. See M 0335.
 0638 Swiss Radio Int'l: Dateline. See S 0208.

Fridays

- 0606 Christian Science Monitor: News Focus. See M 0006.
 0630 BBC: Meridian. See W 0630.
 0634 Christian Science Monitor: Kaleidoscope. See M 1634.
 0635 BBC (Africa): Network Africa. See M 0335.
 0638 Swiss Radio Int'l: Dateline. See S 0208.

Saturdays

- 0605 Christian Science Monitor: Herald of Christian Science. See S 0005.
 0630 BBC: Meridian. See W 0630.
 0635 BBC (Africa): Saturdays Only. See A 0335.
 0638 Swiss Radio Int'l: Dateline. See S 0208.
 0648 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.

0700 UTC**[3:00 AM EDT/12:00 AM PDT]****FREQUENCIES**

0700-0710 w	Malawi B'casting Corp., Blantyre	3381 ^{do}	5995 ^{do}
0700-0710	Radio Bafoussam, Cameroon ¹	4000 ^{do}	
0700-0715	Radio Romania Int'l, Bucharest	11810 ^{au}	11940 ^{au} 15250 ^{au}
		15365 ^{au}	17720 ^{au} 17805 ^{au}
		21665 ^{au}	
0700-0710 mtwhf	Vatican Radio, Vatican City ^{ml}	6185 ^{eu}	6248 ^{eu} 9645 ^{eu}
		11740 ^{eu}	
0700-0730	Radio New Zealand Int'l	17770 ^{pa}	
0700-0730 s	Radio Riga Int'l, Latvia, USSR	5935 ^{eu}	
0700-0800	Ghana B'casting Corp., Accra	6130 ^{af}	
0700-0800	King of Hope, Lebanon	6280 ^{me}	
0700-0800	Radio 1, Accra, Ghana ¹	4915 ^{do}	
0700-0800 f	Radio 2, Accra, Ghana	3366 ^{do}	
0700-0800	CFRX Toronto	6070 ^{do}	
0700-0800	CFCX Montreal	6005 ^{do}	
0700-0800	TWR Swaziland	7200 ^{af}	11750 ^{af}
0700-0800 smtwhf	ZXLA New Zealand	3935 ^{do}	
0700-0800 mtwhf	Italian Radio Relay Svc, Milan	9815 ^{eu}	
0700-0800	Radio Japan, Tokyo	15325 ^{me}	17765 ^{eu} 17810 ^{as}
		17890 ^{as}	21525 ^{as}
0700-0800	R. for Peace Int'l, Costa Rica	7375 ^{na}	13630 ^{na} 15030 ^{na}
		21566 ^{na}	
0700-0800	Radio 2, Lusaka, Zambia	6165 ^{do}	7235 ^{do}
0700-0800 sa	Radio E.Africa, Equatorial Guinea	9585 ^{af}	
0700-0800	Radio Havana Cuba	11835 ^{am}	
0700-0800	Radio Luxembourg	15350 ^{om}	
0700-0800	R. for Peace Int'l, Costa Rica	7375 ^{na}	13630 ^{na}
0700-0800	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}
0700-0800	Radio Pyongyang, North Korea	15340 ^{as}	17765 ^{as}
0700-0800 sa	Radio Thailand, Bangkok	4830 ^{as}	9655 ^{as} 11905 ^{as}
0700-0800 smtwha	RTV Malaysia, Radio 4	7295 ^{do}	
0700-0800	SBC Radio 1, Singapore	5052 ^{do}	11940 ^{do}
0700-0800	Trans World Radio, Monte Carlo	9480 ^{eu}	
0700-0800	WWCR Nashville, Tennessee	7520 ^{am}	
0700-0800	KVOH Los Angeles, California	9785	
0700-0800	BBC London, England	3955 ^{eu}	5955 ^{na} 5975 ^{af}

		6190 ^{af}	6195 ^{as}	7120 ^{eu}
		7150 ^{af}	7230 ^{eu}	7325 ^{me}
		9410 ^{as}	9600 ^{as}	9640 ^{as}
		11760 ^{eu}	11940 ^{af}	11955 ^{as}
		12095 ^{me}	15070 ^{me}	15280 ^{pa}
		15310 ^{me}	15360 ^{af}	15400 ^{af}
		15420 ^{af}	15590 ^{me}	17640 ^{af}
		17790 ^{me}	17830 ^{af}	17885 ^{af}
		21470 ^{af}	21660 ^{af}	21715 ^{af}
		15280 ^{va}	17600 ^{va}	17615 ^{va}
		17710 ^{va}	17790 ^{va}	17810 ^{na}
0700-0800	Radio Moscow World Service	3316 ^{do}		
0700-0800	SLBS, Freetown, Sierra Leone	5950 ^{na}		
0700-0800	Voice of Free China, Taiwan	7140 ^{do}		
0700-0800	Voice of Kenya, Nairobi	6175 ^{as}	9750 ^{as}	15295 ^{as}
0700-0800	Voice of Malaysia, Kuala Lumpur	9455 ^{eu}	9840 ^{eu}	13760 ^{pa}
0700-0800	BBC London, England	17555 ^{as}	17780 ^{va}	
0700-0800	Christian Science World Service	7355 ^{na}	13760 ^{eu}	15566 ^{eu}
0700-0800	WYFR Okeechobee, Florida	13695 ^{na}		
0700-0800	Radio Australia, Melbourne	11930 ^{va}	15240 ^{va}	15320 ^{va}
		17630 ^{va}	17750 ^{va}	21525 ^{va}
		21740 ^{va}	21775 ^{va}	
0700-0800	WHRI Noblesville, Indiana	7315 ^{eu}	9495 ^{sa}	
0700-0800	KTBN Salt Lake City, Utah	7510 ^{na}		
0700-0800	HCJB Quito, Ecuador	9610 ^{va}	9745 ^{va}	11840 ^{va}
0700-0800	Zimbabwe BC Corp., Harare	3396 ^{do}	7283 ^{do}	
0705-0800 a	Radio Douala, Cameroon	4795 ^{do}		
0709-0800 mtwhf	Tristan Radio, Tristan da Cunha	3290 ^{do}		
0730-0800	Radio New Zealand, Wellington	9700 ^{as}		
0730-0800	Radio Austria, Vienna	6155 ^{eu}	13730 ^{eu}	15410 ^{me}
		21490 ^{me}		
0730-0800	AWR Foll, Italy	7230 ^{eu}		
0730-0800	Radio Netherlands, Hilversum	9630 ^{au}	9715 ^{au}	
0730-0800	Radio Prague, Czechoslovakia	17840 ^{pa}	21705 ^{as}	
0730-0800	Swiss Radio Int'l, Bern	3985 ^{eu}	6165 ^{eu}	9535 ^{eu}
0740-0800	Radio Prague Inter-Program	6055 ^{eu}	7345 ^{eu}	9505 ^{eu}
0740-0800	TWR Monte Carlo	9480		

0800 UTC**[4:00 AM EDT/1:00 AM PDT]****FREQUENCIES**

0800-0810 w	Malawi B'casting Corp., Blantyre	3381 ^{do}	
0800-0810	Radio Bafoussam, Cameroon ¹	4000 ^{do}	
0800-0815 mtwhf	Tristan Radio, Tristan da Cunha	3290 ^{do}	
0800-0825	Radio Netherlands, Hilversum	9630 ^{au}	9715 ^{au}
0800-0825	Voice of Malaysia, Kuala Lumpur	6175 ^{as}	9750 ^{as} 15295 ^{as}
0800-0830	Voice of America, Washington	15195 ^{va}	21570 ^{va} 21700 ^{va}
0800-0830	Radio Tirana, Albania	9500 ^{as}	11835 ^{as}
0800-0830	Voice of America, Washington	11735 ^{va}	15160 ^{va} 15195 ^{va}
		21570 ^{va}	
0800-0830	Radio Australia, Melbourne	9710 ^{va}	15160 ^{va} 15240 ^{vs}
		17630 ^{va}	17750 ^{va} 21525 ^{va}
		21775 ^{va}	25750 ^{me}
0800-0830	Voice of Islam, Bangladesh	15195 ^{as}	17815 ^{as}
0800-0825	TWR Swaziland	7200 ^{af}	11750 ^{af}
0800-0850	TWR Monte Carlo	9480	
0800-0900	Radio Finland, Helsinki	17800 ^{pa}	21550 ^{pa}
0800-0900	King of Hope, Lebanon	6280 ^{me}	
0800-0900	HCJB Quito, Ecuador	6205 ^{pa}	9610 ^{pa} 9745 ^{pa}
		11835 ^{pa}	11925 ^{pa}
0800-0900	KNLS Anchor Point, Alaska	11715 ^{as}	
0800-0900	Radio 1, Accra, Ghana ¹	4915 ^{do}	
0800-0900 f	Radio 2, Accra, Ghana	3366 ^{do}	
0800-0900	Radio 2, Lusaka, Zambia	6165 ^{do}	7235 ^{do}
0800-0900 a	Radio Douala, Cameroon	4795 ^{do}	
0800-0900 sa	Radio E.Africa, Equatorial Guinea	9585 ^{af}	
0800-0900	Radio Korea, Seoul, S. Korea	7550 ^{eu}	13670 ^{eu}
0800-0900	Radio Luxembourg	15350 ^{om}	
0800-0900	Radio New Zealand Int'l	9700 ^{pa}	
0800-0900	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}
0800-0900	Radio Pyongyang, North Korea	15180 ^{as}	15230 ^{as}
0800-0900	CFRX Toronto	6070 ^{do}	
0800-0900	CFCX Montreal	6005 ^{do}	
0800-0900 mtwhf	Italian Radio Relay Svc, Milan	9815 ^{eu}	
0800-0900	R. for Peace Int'l, Costa Rica	7375 ^{na}	13630 ^{na} 15030 ^{na}

		21566 ^{na}	
0800-0900 smtwhf	ZXLA New Zealand	3935 ^{do}	
0800-0900 smtwha	RTV Malaysia, Radio 4	7295 ^{do}	
0800-0900	WWCR Nashville, Tennessee	7520 ^{am}	
0800-0900	Radio Korea, Seoul	7550 ^{eu}	13670 ^{eu}
0800-0900	SBC Radio 1, Singapore	5052 ^{do}	11940 ^{do}
0800-0900	SLBS, Freetown, Sierra Leone	3316 ^{do}	5980 ^{do}
0800-0900	BBC London, England	5975 ^{na}	6180 ^{na} 6190 ^{va}
		6195 ^{va}	7150 ^{va} 7325 ^{na} 9410 ^{eu}
		9640 ^{af}	9740 ^{af} 11760 ^{me} 11940 ^{af}
		11955 ^{pa}	12095 ^{eu} 15070 ^{me} 15280 ^{pa}
		15310 ^{me}	15360 ^{me} 15420 ^{af} 15590 ^{me}
		17640 ^{va}	17705 ^{va} 17790 ^{af} 17830 ^{af}
		17885 ^{af}	21470 ^{af} 21660 ^{af} 21715 ^{af}
0800-0900	Christian Science World Service	9455 ^{eu}	11705 ^{va} 13760 ^{va}
		17555 ^{va}	15610 ^{va}
0800-0900	WHRI Noblesville, Indiana	7315 ^{eu}	9495 ^{sa}
0800-0900	VOA Europe, Washington	11740 ^{eu}	15160 ^{eu} 15195 ^{eu}
		21570 ^{eu}	21615 ^{eu}
0800-0900	Voice of Indonesia, Jakarta	11752 ^{as}	11785 ^{as}
0800-0900	Voice of Kenya, Nairobi	7140 ^{do}	
0800-0900	Voice of Nigeria, Lagos	7255 ^{af}	
0800-0900	Zimbabwe BC Corp., Harare	3396 ^{do}	7283 ^{do}
0827-0900	KTWR Guam	11805 ^{as}	
0830-0900	Radio Netherlands, Hilversum	9630 ^{pa}	
0830-0900	Swiss Radio Int'l, Bern	9560 ^{as}	13685 ^{as} 17670 ^{as}
		21695 ^{as}	
0830-0900	Radio Australia, Melbourne	9580 ^{va}	9710 ^{va} 15160 ^{va}
		15240 ^{va}	15320 ^{va} 17630 ^{va}
		21775 ^{va}	25750
0830-0900	Voice of America, Washington	11735 ^{va}	15160 ^{va} 15195 ^{va}
		21570 ^{va}	21700 ^{va}
0835-0850 mtwhf	TWR Swaziland	7200 ^{af}	11750 ^{af}
0840-0850 mtwhfa	Voice of Greece, Athens	15650 ^{au}	17525 ^{au}
0840-0900	Radio Prague Inter-Program	6055 ^{eu}	7345 ^{eu} 9505 ^{eu}
0850-0900 s	TWR Monte Carlo	9480 ^{eu}	

0900 UTC**[5:00 AM EDT/2:00 AM PDT]****FREQUENCIES**

0900-0905	Radio 1, Accra, Ghana ¹	4915 _{do}		
0900-0905 f	Radio 2, Accra, Ghana	3366 _{do}		
0900-0910	Malawi B'casting Corp., Blantyre	5995 _{do}		
0900-0915	Radio Voice of Lebanon, Beirut	6549.5 _{me}		
0900-0925	Radio Netherlands, Hilversum	9630 _{pa}		
0900-0930 mtwhf	ZXLA New Zealand	3935 _{do}		
0900-0930	R. for Peace Int'l, Costa Rica	7375na 13630na 15030na		
		21566na		
0900-0930	Radio Australia, Melbourne	9580 _{na} 13705 _{va} 15160 _{va}		
		15240 _{va} 17630 _{va} 17715 _{va}		
		17750 _{va} 21775 _{va} 25750 _{me}		
0900-0935 s	TransWorld Radio, Monte Carlo	9480 _{eu}		
0900-0950	Deutsche Welle, Köln, Germany	9565 _{af} 15410 _{af} 21600 _{af}		
0900-0950	Deutsche Welle, Köln, Germany	6160as 11915as 17780as		
		17820as 21465as		
		21650as 21680as		
0900-1000	Christian Science World Svc	9455va 11705va 13760va		
		15610va 17555va		
0900-1000 s	BBS, Thimphu, Bhutan	5023 _{do}		
0900-1000	Radio New Zealand, Wellington	9700 _{pa}		
0900-1000	WWCR Nashville, Tennessee	7520 _{am}		
0900-1000	TWR Monte Carlo	9480		
0900-1000 mtwhf	Italian Radio Relay Svc, Milan	9815 _{eu}		
0900-1000	BBC London, England	5975 _{na} 6180 _{na} 6190 _{va}		
		6195 _{va} 7150 _{va} 7325 _{na}		
		9410 _{eu} 9640 _{af} 9740 _{af}		
		11760 _{me} 11940 _{af} 11955 _{pa}		
		12095 _{eu} 15070 _{va} 15280 _{pa}		
		15310 _{me} 15360 _{me} 15420 _{af}		
		15590 _{me} 17640 _{va} 17705 _{va}		
		17790 _{af} 17830 _{af} 17885 _{af}		
		21470 _{af} 21660 _{af} 21715 _{pa}		
0900-1000	CFRX Toronto	6070 _{do}		
0900-1000	CFCX Montreal	6005 _{do}		

0900-1000	KTWR Guam	11805 _{as}		
0900-1000	HCJB Quito, Ecuador	9745 _{va}		
0900-1000	FEBC Radio Int'l, Philippines	9800 _{as}	11665 _{as}	
0900-1000	King of Hope, Lebanon	6280 _{me}		
0900-1000	Radio 2, Lusaka, Zambia	6165 _{do}	7235 _{do}	
0900-1000	Radio Beijing, China	11755 _{au}	15440 _{au}	17710 _{au}
0900-1000 sa	Radio E.Africa, Equatorial Guinea	9585 _{af}		
0900-1000	Radio Japan, Tokyo	15270 _{pa}	17890 _{pa}	
0900-1000	Radio Luxembourg	15350 _{om}		
0900-1000	Radio Nigeria, Lagos	3326 _{do}	4990 _{do}	
0900-1000	Radio Tanzania, Dar es Salaam	5985 _{af}	9685 _{af}	11765 _{af}
0900-1000	RTV Malaysia, Radio 4	7295 _{do}		
0900-1000	SBC Radio 1, Singapore	5052 _{do}	11940 _{do}	
0900-1000	SLBS, Freetown, Sierra Leone	3316 _{do}		
0900-1000	VOA Europe, Washington	11740 _{eu}	15160 _{eu}	15195 _{eu}
		21570 _{eu}	21615 _{eu}	
0900-1000	Voice of Kenya, Nairobi	7140 _{do}		
0900-1000	Voice of Nigeria, Lagos	7255 _{af}		
0900-1000	Zimbabwe BC Corp., Harare	3396 _{do}	7283 _{do}	
0905-1000	Cameroon Radio-TV, Yaounde	4850 _{do}		
0905-1000 sa	Radio 1, Accra, Ghana ¹	4915 _{do}		
0905-1000 sa	Radio 2, Accra, Ghana	3366 _{do}		
0905-1000 mtwhf	Radio 2 (Schools Prog), Ghana	7295 _{do}		
0910-0940 smwha	Ulaanbaatar Radio, Mongolia	11850 _{pa}	12015 _{pa}	
0920-1000	BFBF (British Forces), London	15245 _{me}	17830 _{me}	21745 _{me}
0930-0940	RTV Togo, Lome	7265 _{do}		
0930-1000	Radio Australia, Melbourne	9580 _{na}	15240 _{va}	17630 _{va}
		17715 _{va}	17750 _{va}	21775 _{va}
		21825 _{va}	25750 _{me}	
		11895 _{pa}		
0930-1000	Radio Netherland, Hilversum	4940 _{as}	9635 _{as}	17655 _{as}
0930-1000	Radio Afghanistan, Kabul	21600 _{as}		
0940-1000	Radio Prague Inter-Program	6055 _{eu}	7345 _{eu}	9505 _{eu}

1000 UTC**[6:00 AM EDT/3:00 AM PDT]****FREQUENCIES**

1000-1015 mtwhf	Radio Budapest, Hungary	6110 _{as} 9585 _{as} 9835 _{as}		
		11925 _{as} 15160 _{as} 15220 _{as}		
1000-1025	Radio Netherland, Hilversum	11895 _{pa}		
1000-1025 mtwhf	BRT, Brussels, Belgium	6035 _{eu}	13675 _{eu}	21810 _{af}
1000-1030	Kol Israel, Jerusalem	11588na 15650eu 17575na		
		17590eu 21710ca 21790eu		
1000-1030	Radio Tanzania, Dar es Salaam	5985 _{af} 9685 _{af} 11765 _{af}		
1000-1030	Radio Australia, Melbourne	6080 _{va} 9580 _{na} 9760 _{va}		
		15240 _{va} 17715 _{va} 21775 _{va}		
1000-1030	Radio Afghanistan, Kabul	4940 _{as} 9635 _{as} 17655 _{as}		
		21600 _{as}		
1000-1030	Voice of Vietnam, Hanoi	9755 _{as} 12020 _{as}		
1000-1100	All India Radio, Delhi	15050 _{as} 15335 _{as} 17387 _{as}		
		17865 _{as} 21735 _{as}		
1000-1100	Cameroon Radio-TV, Yaounde	4850 _{do}		
1000-1100 sa	Radio 1, Accra, Ghana ¹	4915 _{do}		
1000-1100 sa	Radio 2, Accra, Ghana	3366 _{do}		
1000-1100 mtwhf	Radio 2 (Schools Prog), Ghana	7295 _{do}		
1000-1100	Radio 2, Lusaka, Zambia	6165 _{do}	7235 _{do}	
1000-1100	Radio Beijing, China	11755 _{au}	15440 _{au}	17710 _{au}
1000-1100	CFCX Montreal	6005 _{do}		
1000-1100	CFRX Toronto	6070 _{do}		
1000-1100	KSDA Guam	13720 _{as}		
1000-1100 mtwhf	Italian Radio Relay Svc	9815 _{eu}		
1000-1100 sa	Radio E.Africa, Equatorial Guinea	9585 _{af}		
1000-1100	Radio Luxembourg	15350 _{om}		
1000-1100	FEBC Mainila, Philippines	9800 _{as}	11665 _{as}	
1000-1100	WWCR Nashville, Tennessee	7520 _{na}		
1000-1100	HCJB Quito, Ecuador	9745 _{pa}	11925 _{pa}	
1000-1100	Radio New Zealand, Wellington	9700 _{pa}		
1000-1100	BBC London, England	5975 _{na} 6180 _{na} 6190 _{va}		
		6195 _{va} 7150 _{va} 7325 _{na}		
		9410 _{eu} 9640 _{af} 9740 _{af}		
		11760 _{me} 11940 _{af} 11955 _{pa}		
		12095 _{eu} 15070 _{va} 15280 _{pa}		
		15310 _{me} 15360 _{me} 15420 _{af}		
		15590 _{me} 17640 _{va} 17705 _{va}		

1000-1100	Christian Science World Svc	17790 _{af} 17830 _{af} 17885 _{af}		
		21470 _{af} 21660 _{af} 21715 _{af}		
		9455 _{eu} 9495 _{eu} 13625 _{pa}		
		15610 _{va} 17555 _{va} (9820 _{pa})		
1000-1100	WYFR Okeechobee, Florida	5985 _{am}		
		1000-1100		
KTBN Salt Lake City Utah	7510 _{am}			
1000-1100	TWR Costa Rica	9725 _{ca}		
1000-1100	Radio Nigeria, Lagos	4990 _{do}	7285 _{do}	
1000-1100 mtwhf	RTV Malaysia, Radio 4	7295 _{do}		
1000-1100	SBC Radio 1, Singapore	5010 _{do}	5052 _{do}	11940 _{do}
1000-1100	SLBS, Freetown, Sierra Leone	3316 _{do}		
1000-1100 s	Tristan Radio, Tristan da Cunha	3290 _{do}		
1000-1100	Voice of America, Washington	5985 _{as} 11720 _{as} 11740 _{va}		
		15160 _{va} 15195 _{va} 15425 _{as}		
		21570 _{va} 21615 _{va}		
1000-1100	Voice of America, Washington	9590 _{ca}	11915 _{ca}	15120 _{ca}
1000-1100	Voice of Kenya, Nairobi	7140 _{do}		
1000-1100	Voice of Nigeria, Lagos	7255 _{af}		
1000-1100	Zimbabwe BC Corp., Harare	3396 _{do}	7283 _{do}	
1000-1015 mtwhf	Radio Budapest, Hungary	6110 _{as} 9585 _{as} 9835 _{as}		
		11925 _{as} 15160 _{as} 15220 _{as}		
1030-1040 mtwhf	Malawi B'casting Corp., Blantyre	5995 _{do}		
1030-1045 mtwhf	Radio Budapest, Hungary	6110 _{as} 9585 _{as} 9835 _{as}		
		11925 _{as} 15160 _{as} 15220 _{as}		
1030-1100	Radio Australia, Melbourne	6080 _{va} 9580 _{na} 9760 _{va}		
		11715 _{va} 21775 _{va}		
1030-1100 sa	Radio Tanzania, Dar es Salaam	5985 _{af} 9685 _{af} 11765 _{af}		
1030-1100	Sri Lanka B'casting Corp.	11835 _{as} 15120 _{as} 17850 _{as}		
1030-1100	Radio Zambia Int'l, Lusaka ¹	9505 _{af} 11880 _{af} 17895 _{af}		
1030-1100	Radio Austria, Vienna	15450 _{as} 21490 _{as}		
1030-1100	AWR Foli, Italy	7230 _{eu}		
1030-1100	Radio Korea, Seoul	11715 _{na}		
1030-1100	UAE Radio, Dubai	15435 _{eu}	21605 _{eu}	
	United Arab Emirates			
1040-1050 mtwhfa	Voice of Greece, Athens	15650 _{as} 17535 _{as}		
1040-1100	Radio Prague Inter-Program	6055 _{eu} 7345 _{eu} 9505 _{eu}		
1045-1100 s	Radio Budapest, Hungary	7220 _{eu} 9585 _{eu} 9835 _{eu}		
		11910 _{eu} 15160 _{eu} 15220 _{eu}		

VACATION PACKAGE: Set Up in Your Car or Cottage!

The Grove Hidden Antenna *For improved indoor scanner reception!*

Although designed to attach to the powerful Grove PRE-4 signal booster, the Hidden Antenna may be used alone with your scanner, replacing the plug-in whip, for improved signal reception.

This five-foot, thin-profile, flexible wire antenna can be hung in a corner, behind a drape -- just about anywhere out of sight.

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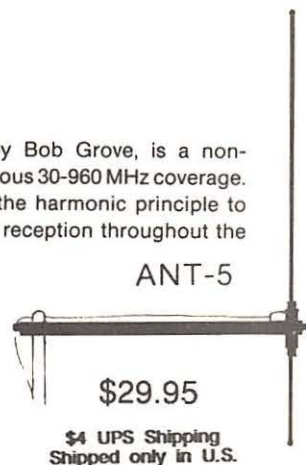
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1100 UTC**[7:00 AM EDT/4:00 AM PDT]****FREQUENCIES**

1100-1110 sa	Malawi B'casting Corp., Blantyre	5995 ^{do}			
1100-1110 mtwhf	Radio 2 (Schools Program), Ghana	7295 ^{do}			
1100-1120	Radio Pakistan, Islamabad	17565 ^{eu}	21520 ^{eu}		
1100-1130	Radio Mozambique, Maputo	9525 ^{af}	11818 ^{af}	11835 ^{af}	
1100-1130	Sri Lanka B'casting Corp.	11835 ^{as}	15120 ^{as}	17850 ^{as}	
1100-1130	Swiss Radio Int'l, Bern	13635 ^{as}	15570 ^{as}	17830 ^{as}	
		21770 ^{as}			
1100-1130	Voice of Vietnam, Hanoi	7416 ^{as}	9732 ^{as}		
1100-1150	Deutsche Welle, Köln, Germany	11890 ^{af}	15410 ^{af}	17765 ^{af}	
		17800 ^{af}	17860 ^{af}	21600 ^{af}	
1100-1200	Radio Australia, Melbourne	6080 ^{va}	7240 ^{va}	9580 ^{na}	
		9710 ^{va}	9760 ^{va}	11930 ^{va}	
		15160 ^{va}	17715 ^{va}	21775 ^{va}	
		21825 ^{va}			
1100-1200	Radio 1, Accra, Ghana ¹	4915 ^{do}			
1100-1200 sa	Radio 2, Accra, Ghana	3366 ^{do}			
1100-1200	TWR Bonaire	11815 ^{am}	15345 ^{am}		
1100-1200	Radio Japan, Tokyo	6120 ^{na}	11815 ^{sa}	11840 ^{na}	
		12070 ^{na}			
1100-1200	CFCX Montreal	6005 ^{do}			
1100-1200	CFRX Toronto	6070 ^{do}			
1100-1200	Radio Jordan, Amman	13655 ^{na}			
1100-1200 mtwhf	Italian Radio Relay Svc, Milan	9815 ^{eu}			
1100-1200	WYFR Okeechobee, Florida	5950 ^{na}	7355 ^{na}	11900 ^{ca}	
1100-1200	KTBN Salt Lake City, Utah	7510 ^{na}			
1100-1200	Radio Beijing, China	15135 ^{eu}			
1100-1200	Christian Science World Svc	9455 ^{eu}	9495 ^{eu}	13625 ^{pa}	
		17555 ^{pa}	15610 ^{pa}	(9820 ^{pa})	
1100-1200	HCJB Quito, Ecuador	11740 ^{na}			
1100-1200	BBC London, England	5975 ^{na}	6180 ^{na}	6190 ^{va}	
		6195 ^{va}	7150 ^{va}	7325 ^{na}	
		9640 ^{af}	9740 ^{af}	11760 ^{me}	
		11955 ^{pa}	12095 ^{eu}	15070 ^{va}	
		15280 ^{me}	15310 ^{me}	15420 ^{af}	
		17640 ^{va}	17705 ^{me}	17790 ^{af}	
		17885 ^{af}	21470 ^{af}	21660 ^{af}	
			6165 ^{do}	7235 ^{do}	
1100-1200	Radio 2, Lusaka, Zambia	6120 ^{na}	11815 ^{na}	11840 ^{na}	
1100-1200 mtwhf	Radio Douala, Cameroon	4795 ^{do}			
1100-1200	Radio Japan, Tokyo	6120 ^{na}	11815 ^{na}	11840 ^{na}	
1100-1200	WYFR Okeechobee, Florida	5950 ^{na}	11580 ^{na}		
1100-1200	Radio Moscow World Service	6000 ^{va}	9705 ^{va}	9780 ^{va}	
		9875 ^{va}	11920 ^{va}	15175 ^{va}	
		15345 ^{va}	15435 ^{va}	15465 ^{va}	
		17565 ^{va}	17605 ^{va}	17780 ^{va}	
		17810 ^{va}	17840 ^{va}	17870 ^{va}	
		21785 ^{va}		17880 ^{va}	
1100-1200	Trans World Radio, Bonaire	11815 ^{na}	15345 ^{na}		
1100-1200	Radio Korea, Seoul	9650 ^{na}	15575 ^{na}		
1100-1200	Radio New Zealand, Wellington	9700 ^{pa}			
1100-1200	HCJB Quito, Ecuador	11740 ^{na}			
1100-1200	Christian Science World Svc	9455 ^{eu}	9495 ^{eu}	13625 ^{pa}	
		15610 ^{eu}	17555 ^{pa}		
1100-1200 sa	Radio E.Africa, Equatorial Guinea	9585 ^{af}			
1100-1200	Radio Korea, Seoul, South Korea	15575 ^{af}			
1100-1200	Radio Luxembourg	15350 ^{om}			
1100-1200	Radio Nigeria, Lagos	4990 ^{do}	7285 ^{do}		
1100-1200	Radio Pyongyang, North Korea	6576 ^{na}	9977 ^{na}	11335 ^{na}	
1100-1200	Radio RSA, South Africa	9555 ^{af}	11805 ^{af}	11900 ^{af}	
		17835 ^{af}			
1100-1200 sa	Radio Tanzania, Dar es Salaam	5985 ^{af}	9685 ^{af}	11765 ^{af}	
1100-1200	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af}	17895 ^{af}	
1100-1200	RTV Malaysia, Radio 4	7295 ^{do}			
1100-1200	SBC Radio 1, Singapore	5010 ^{do}	5052 ^{do}	11940 ^{do}	
1100-1200	SLBS, Freetown, Sierra Leone	3316 ^{do}			
1100-1200 s	Tristan Radio, Tirstan da Cunha	3290 ^{do}			
1100-1200	Voice of America, Washington	5985 ^{as}	6110 ^{as}	9760 ^{as}	
		11720 ^{as}	15155 ^{as}	15425 ^{as}	
		9590 ^{ca}	11915 ^{ca}	15120 ^{ca}	
1100-1200	Voice of America, Washington	9590 ^{ca}			
1100-1200	Voice of Asia, Kaohsiung, Taiwan	7445 ^{as}			
1100-1200	Voice of Kenya, Nairobi	7140 ^{do}			
1100-1200	Voice of Nigeria, Lagos	7255 ^{af}			
1100-1200 war	Voice of Peace, Baghdad, Iraq	11860 ^{me}	21675 ^{me}		
1100-1200	Zimbabwe B'casting Corp., Harare	3395 ^{do}	7283 ^{do}		
1110-1115 mtwhf	Radio Botswana, Gaborone	5955 ^{af}	7255 ^{af}		
1115-1145	Voice of Radio Nepal, Kathmandu	5005 ^{as}	7165 ^{as}		
1120-1140	Hunan PBS, Changs ha, China ⁴	4990 ^{do}			
1125-1130 sa	Radio Botswana, Gaborone	5955 ^{af}	7255 ^{af}		
1130-1140	Radio Lesotho, Maseru	4800 ^{do}			
1130-1145 mtwhf	Vatican Radio, Vatican City ^{ml}	6248 ^{eu}	9645 ^{eu}	11740 ^{eu}	
		15210 ^{eu}			
1130-1145 a	Radio Budapest, Hungary	7220 ^{eu}	9585 ^{eu}	9835 ^{eu}	
		11910 ^{eu}	15160 ^{eu}	15220 ^{eu}	
1130-1145	RTV Malaysia-Sarawak, Red Network	5950 ^{do}	7160 ^{do}		
1130-1200	Radio Sweden, Stockholm	11960 ^{as}	17740 ^{as}	21570 ^{pa}	
1130-1200	Radio Austria Int'l, Vienna	6155 ^{eu}	13730 ^{eu}	15430 ^{as}	
		21490 ^{na}			
1130-1200 mtwhf	Radio Finland, Helsinki	15400 ^{na}	21550 ^{na}		
1130-1200	Radio Netherlands, Hilversum	5955 ^{eu}	9715 ^{eu}	17575 ^{eu}	
		21480 ^{eu}	21520 ^{eu}		
1130-1200	Radio Thailand, Bangkok	4830 ^{as}	9655 ^{as}	11905 ^{as}	
1130-1200	Radio Tirana, Albania	9480 ^{as}	11835 ^{as}		
1130-1200	Voice of America, Washington	11735 ^{me}	15160 ^{me}	15225 ^{me}	
		21550 ^{me}	21705 ^{me}		
1130-1200	Voice of the Islamic Republic of Iran, Tehran	9525 ^{va}	9685 ^{va}	9705 ^{va}	
		11745 ^{va}	11790 ^{va}		
1140-1200	Radio Prague Inter-Program	6055 ^{eu}	7345 ^{eu}	9505 ^{eu}	
1145-1200	Radiodiffusion Nationale de la Republique du Burundi, Bujumbura	6140 ^{af}			

SELECTED PROGRAMS**Sunday**

- 1108 Swiss Radio Int'l: Feature. See S 0638.
 1115 Radio Korea: Echoes of Korean Music. Program details not available at press time.
 1130 BBC: The Ken Bruce Show. See S 0030.
 1130 Radio Austria Int'l: Austrian Shortwave Panorama. Developments in communications and shortwave radio news.
 1135 Radio Korea: Shortwave Feedback. Listener letters, opinions, and suggestions.

Mondays

- 1106 Christian Science Monitor: Encore. See M 0106.
 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1115 Radio Korea: News Commentary. See S 0015.
 1120 Radio Korea: Seoul Calling. Music, features, and short interviews relating to Korea.
 1130 BBC: Composer Of The Month. See M 0230.
 1130 Radio Austria Int'l: Report from Austria. See S 0130.
 1134 Christian Science Monitor: Letterbox. See M 0134.
 1140 Radio Korea: Let's Learn Korean! Korean language lessons for English speakers.
 1145 Radio Korea: Sports Roundup. Detailed news on sports in Korea.
 1148 Christian Science Monitor: Religious Article. See M 0148.

Tuesdays

- 1106 Christian Science Monitor: One Norway Street. See M 2306.
 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1115 Radio Korea: News Commentary. See S 0015.
 1120 Radio Korea: Seoul Calling. See M 1120.

- 1130 BBC: Megamix. Music, sports, fashion, health, travel, news, and opinion for young people.
 1130 Radio Austria Int'l: Report from Austria. See S 0130.
 1134 Christian Science Monitor: Letterbox. See M 0134.
 1140 Radio Korea: Let's Learn Korean! See M 1140.
 1145 Radio Korea: Korean Cultural Variety. A look at Korean cultural and artistic traditions.
 1148 Christian Science Monitor: Religious Article. See M 0148.

Wednesdays

- 1106 Christian Science Monitor: Curtain Call. See T 2306.
 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1115 Radio Korea: News Commentary. See S 0015.
 1120 Radio Korea: Seoul Calling. See M 1120.
 1130 BBC: Meridian. See W 0630.
 1130 Radio Austria Int'l: Report from Austria. See S 0130.
 1134 Christian Science Monitor: Letterbox. See M 0134.
 1140 Radio Korea: Let's Learn Korean! See M 1140.
 1145 Radio Korea: Pulse of Korea. Reports on the development of Korea.
 1148 Christian Science Monitor: Religious Article. See M 0148.

Thursdays

- 1106 Christian Science Monitor: One Norway Street. See M 2306.
 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1115 Radio Korea: News Commentary. See S 0015.
 1120 Radio Korea: Seoul Calling. See M 1120.
 1130 BBC: Drama. The BBC's crack drama unit is at it again.
 1130 Radio Austria Int'l: Report from Austria. See S 0130.

- 1134 Christian Science Monitor: Letterbox. See M 0134.
 1140 Radio Korea: Let's Learn Korean! See M 1140.
 1145 Radio Korea: Focus This Week. Analysis and interviews regarding Korean public affairs.
 1148 Christian Science Monitor: Religious Article. See M 0148.

Fridays

- 1106 Christian Science Monitor: One Norway Street. See M 2306.
 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1115 Radio Korea: News Commentary. See S 0015.
 1120 Radio Korea: Let's Sing Together. A sing-along program, featuring the Song of the Month! Oh boy!
 1130 BBC: Meridian. See W 0630.
 1130 Radio Austria Int'l: Report from Austria. See S 0130.
 1134 Christian Science Monitor: Letterbox. See M 0134.
 1145 Radio Korea: Listeners' Forum. Listener opinions on various subjects.
 1148 Christian Science Monitor: Religious Article. See M 0148.

Saturdays

- 1105 Christian Science Monitor: Herald of Christian Science. See S 0005.
 1108 Swiss Radio Int'l: Dateline. See S 0208.
 1115 Radio Korea: News Commentary. See S 0015.
 1118 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.
 1120 Radio Korea: Sites and Sounds. See S 0020.
 1130 BBC: Meridian. See W 0630.
 1130 Radio Austria Int'l: Austrian Coffeetable. A look at the arts, especially music.
 1135 Radio Korea: From Us to You. See S 0035.

1200 UTC

[8:00 AM EDT/5:00 AM PDT]

FREQUENCIES

1200-1210	Radio New Zealand, Wellington	9700pa		
1200-1210 w	Malawi B'casting Corp., Blantyre	3381do	5995do	
1200-1215	Voice of the People of Cambodia, Phnom-Penh	9695as	11938as	
1200-1225 sa	Radio 2, Accra, Ghana	3366do		
1200-1225	Radio Netherlands, Hilversum	5955eu	9715eu	17575eu
		21480eu	21520eu	
1200-1225	Voice of the Islamic Republic of Iran, Tehran	9525va	9685va	9705va
		11745va	11790va	
1200-1230 as	Radio Norway, Oslo	17820me	21695as	
1200-1230	Radio Tashkent, Uzbekistan	9540as	9600as	15420as
1200-1230	Radio Mogadishu, Somalia	6095af		
1200-1230	Radio Romania Int'l, Bucharest	15365as	15380as	17720as
1200-1230	Radio Thailand, Bangkok	4830as	9655as	11905as
1200-1230 s	Radio Zambia Int'l, Lusaka ¹	9505af	11880af	17895af
1200-1230	Radio Yugoslavia, Belgrade	17725eu	17740na	21600as
1200-1230	Radio Australia, Melbourne	5995pa	6080pa	7240pa
		9580pa	11800as	11930as
		15320pa	21525as	
1200-1230 smwha	Ulaanbaatar Radio, Mongolia	11850as	12015as	
1200-1230 mtwhf	Vatican Radio, Vatican City	17865as	21515as	
1200-1230	Voice of America, Washington	6110as	9760as	11715as
		15155as	15425as	
1200-1300	Radio 1, Accra, Ghana ¹	4915do		
1200-1300	Radio Beijing, China	15110am	17715am	
1200-1300	Radio Beijing, China	8425as	11660as	
1200-1300 mtwhf	Radio Douala, Cameroon	4795do		
1200-1300 sa	Radio E. Africa, Equatorial Guinea	9585af		
1200-1300 mtwhf	Radio Canada Int'l, Montreal	9635am	11855am	17820am
1200-1300	Radio Jordan, Amman	13655me		
1200-1300	WYFR Okeechobee, Florida	5950am	6015am	11580am
		17750am		
1200-1300	Radio Luxembourg	15350om		
1200-1300	Radio Nigeria, Lagos	4990do	7285do	
1200-1300 sa	Radio Tanzania, Dar es Salaam	5985af	9684af	11765af
1200-1300	CFCX Montreal	6005do		
1200-1300	CFRX Toronto	6070do		
1200-1300 mtwhf	Italian Radio Relay Svc, Milan	9815eu		
1200-1300	WWCR Nashville, Tennessee	15690na		
1200-1300	Radio Canada Int'l, Montreal	9635am	11855am	17820am
1200-1300	ABC Perth	9610		
1200-1300	BBC London, England	3955eu	5955na	5975af
		6190af	6195as	7120eu
		7150af	7230eu	7325me
		9410as	9600as	9740as
		11760eu	11940af	11955as

1200-1300	TWR Bonaire	12095me	15070me	15220pa
1200-1300	KTBN Salt Lake City, Utah	15310me	15360af	15400af
1200-1300	Christian Science World Service	15420af	15590me	17640af
		17790me	17830af	17885af
		21470af	21660af	21715af
		11815am	15345am	
		7510am		
1200-1300	Radio Korea, Seoul, S. Korea	9475am	9495am	13625am
1200-1300	HCJB Quito, Ecuador	13760am	15610pa	
1200-1300	Radio Moscow World Service	9750na		
		11740am	15115am	17890am
		6000	7305	9705
		9875	11920	13705
		15280	15345	15465
		15520	15550	17565
		17665	17780	17790
		17810	17870	17880
		21680	21725	21785
1200-1300	RTV Malaysia, Radio 4	7295do		
1200-1300	SBC Radio 1, Singapore	5010do	5052do	11940do
1200-1300	SLBS, Freetown, Sierra Leone	3316do	5980do	
1200-1300	Voice of Kenya, Nairobi	7140do		
1200-1300	Voice of Nigeria, Lagos	7255af		
1200-1300 war	Voice of Peace, Baghdad, Iraq	11860me	21675me	
1215-1230	Radio Bayrak, Cyprus	6150va		
1215-1300	Radio Korea, Seoul	9750am		
1215-1300	Radio Cairo, Egypt	17595as		
1226-1300	Radio 2, Accra, Ghana	7295do		
1230-1255 S	BRT, Brussels, Belgium	21810na		
1230-1300	Voice of Turkey, Ankara	9675eu	17785as	
1230-1255 mtwhf	Radio Finland, Helsinki	15400am	21550am	
1230-1300	Radio Bangladesh, Dhaka	15200as	15605as	15647as
		17750as		
1230-1300	Radio Sweden, Stockholm	11715as	17740as	21570as
1230-1300	Sri Lanka B'casting Corp.	6075as	9720as	
1230-1300	Radio France Int'l, Paris	9805eu	11670eu	15155eu
		15195eu	21635na	21645na
1230-1300 mtwhf	Tristan Radio, Tristan da Cunha	3290do		
1230-1300	Voice of America, Washington	6110as	9760as	11715as
		15155as	15425as	
1230-1300	Radio Australia, Melbourne	5995pa	6080pa	7240pa
		9580pa	9770as	11930pa
		15320as	21525as	
1230-1300	Voice of Vietnam, Hanoi	9840as	12020as	15010as
1235-1245	Voice of Greece, Athens	15550am	15650am	17525am
1240-1300	Radio Prague Inter-Program	6055eu	7345eu	9505eu

SELECTED PROGRAMS

Sundays

- 1201 BBC: Play Of The Week. See S 0101.
 1205 Christian Science Monitor: Herald of Christian Science. See S 0005.
 1230 Radio Korea: Echoes of Korean Music. See S 1115.
 1250 Radio Korea: Shortwave Feedback. See S 1135.

Mondays

- 1206 Christian Science Monitor: News Focus. See M 0006.
 1215 BBC: Quiz. Robert Robinson returns with the general-knowledge game show "Brain Of Britain" (through August 12th).
 1230 Radio Korea: News Commentary. See S 0015.
 1234 Christian Science Monitor: Home Forum. See M 0034.
 1235 Radio Korea: Seoul Calling. See M 1120.
 1245 BBC: Sports Roundup. News from the world of sports.
 1255 Radio Korea: Let's Learn Korean! See M 1140.

Tuesdays

- 1206 Christian Science Monitor: News Focus. See M 0006.
 1215 BBC: Multitrack 1: Top 20. See M 2330.
 1230 Radio Korea: News Commentary. See S 0015.
 1234 Christian Science Monitor: Kaleidoscope. See M

1634.
 1235 Radio Korea: Seoul Calling. See M 1120.
 1245 BBC: Sports Roundup. See M 1245.
 1255 Radio Korea: Let's Learn Korean! See M 1140.

Wednesdays

- 1206 Christian Science Monitor: News Focus. See M 0006.
 1215 BBC: New Ideas. See M 1615.
 1230 Radio Korea: News Commentary. See S 0015.
 1234 Christian Science Monitor: Kaleidoscope. See M 1634.
 1235 BBC: Talks. See M 1635.
 1235 Radio Korea: Seoul Calling. See M 1120.
 1245 BBC: Sports Roundup. See M 1245.
 1255 Radio Korea: Let's Learn Korean! See M 1140.

Thursdays

- 1206 Christian Science Monitor: News Focus. See M 0006.
 1215 BBC: Multitrack 2. See W 2330.
 1230 Radio Korea: News Commentary. See S 0015.
 1234 Christian Science Monitor: Kaleidoscope. See M 1634.
 1235 Radio Korea: Seoul Calling. See M 1120.
 1245 BBC: Sports Roundup. See M 1245.
 1255 Radio Korea: Let's Learn Korean! See M 1140.

Fridays

- 1206 Christian Science Monitor: News Focus. See M

We would especially like to hear from our African readers regarding the status of Radio Nigeria, a very much missed voice of Western Africa.

0006.
 1215 BBC: Feature. This month's fare kicks off with "A Time To Die" (5th), a look at the question of euthanasia.
 1230 Radio Korea: News Commentary. See S 0015.
 1234 Christian Science Monitor: Kaleidoscope. See M 1634.
 1235 Radio Korea: Let's Sing Together. See F 1120.
 1245 BBC: Sports Roundup. See M 1245.

Saturdays

- 1205 Christian Science Monitor: Herald of Christian Science. See S 0005.
 1215 BBC: Multitrack 3. See F 2330.
 1230 Radio Korea: News Commentary. See S 0015.
 1235 Radio Korea: Sites and Sounds. See S 0020.
 1245 BBC: Sports Roundup. See M 1245.
 1250 Radio Korea: From Us to You. See S 0035.

1300 UTC**[9:00 AM EDT/6:00 AM PDT]****FREQUENCIES**

1300-1315	Radio Jordan, Amman	13655na
1300-1315	Radio Korea, Seoul, S. Korea	9750 _{na}
1300-1325	BRT Belgium	21810 _{na}
1300-1325	Voice of Kenya, Nairobi	7140 _{do}
1300-1330 as	Radio Finland, Helsinki	15400 _{na} 21550 _{na}
1300-1330 as	Radio Norway, Oslo	9590 _{eu} 11860 _{eu}
1300-1330	Radio Australia, Melbourne	5995 _{pa} 7240 _{pa} 9580 _{pa}
		9770 _{as} 9860 _{as} 17630 _{as}
1300-1330	TWR Boniare	11815 _{am} 15345 _{am}
1300-1330	Radio Sweden, Stockholm	11960 _{as} 17740 _{as} 21570 _{as}
1300-1330	Radio Yugoslavia, Belgrade	21715 _{am}
1300-1330	Radio Cairo, Egypt	17595 _{as}
1300-1330	Radio Beijing, China	11600 _{as} 11660 _{as}
1300-1330 mtwhf	Radio Douala, Cameroon	4795 _{do}
1300-1330	Voice of America, Washington	6110 _{as} 9760 _{as} 11715 _{as}
		15155 _{as} 15245 _{as}
1300-1400	FEBC Radio Int'l, Philippines	11850 _{as}
1300-1400	Radio 1, Accra, Ghana	4915 _{do}
1300-1400	Radio 2, Accra, Ghana	7295 _{do}
1300-1400 sa	Radio E. Africa, Equatorial Guinea	9585 _{af}
1300-1400	Radio Jordan, Amman	13655 _{??}
1300-1400	BBC London, England	3955 _{eu} 5955 _{na} 5975 _{af}
		6190 _{af} 6195 _{as} 7120 _{eu}
		7150 _{af} 7230 _{eu} 7325 _{me}
		9515 _{as} 9600 _{as} 9740 _{as}
		11775 _{eu} 11940 _{af} 11955 _{as}
		12095 _{me} 15070 _{me} 15220 _{pa}
		15310 _{me} 15360 _{af} 15400 _{af}
		15420 _{af} 15590 _{me} 17640 _{af}
		17790 _{me} 17830 _{af} 17885 _{af}
		21470 _{af} 21660 _{af} 21715 _{af}
1300-1400	Radio Moscow World Service	6000 _{va} 9705 _{va} 9780 _{va}
		9875 _{va} 11920 _{va} 15175 _{va}
		15280 _{va} 15345 _{va} 15435 _{va}
		15465 _{va} 15520 _{va} 17565 _{va}
		17605 _{va} 17780 _{va} 17790 _{va}
		17810 _{va} 17840 _{va} 17870 _{va}
		17880 _{va} 21785 _{va}
1300-1400	Radio Luxembourg	15350 _{om}
1300-1400	R. Station Peace & Progress	7330 _{as} 7380 _{as} 9675 _{as}
		11775 _{as} 15520 _{as} 15535 _{as}
		17665 _{as} 17840 _{as}
1300-1400 mtwhf	Italian Radio Relay Svc, Milan	9815 _{eu}
1300-1400	CFCX Montreal	6005 _{do}
1300-1400	CFRX Toronto	6070 _{do}
1300-1400	Radio Nigeria, Lagos	4990 _{do} 7285 _{do}

1300-1400 s	Radio Canada Int'l, Montreal	11955 _{am} 17820 _{am}
1300-1400	FEBC Manila	11685 _{pa}
1300-1400	Radio Pyongyang, North Korea	9325 _{eu} 9345 _{eu} 9640 _{as}
		13650 _{as} 15230 _{as}
1300-1400	Radio Romania Int'l, Bucharest	11940 _{eu} 15365 _{eu} 17720 _{eu}
		21665 _{eu}
1300-1400 sa	Radio Tanzania, Dar es Salaam	5985 _{af} 9684 _{af} 11765 _{af}
1300-1400	ABC Perth	9610
1300-1400	Christian Science World Svc	9475 _{pa} 9495 _{pa} 13625 _{pa}
		13760 _{pa} 15610 _{pa}
1300-1400	HCJB Quito, Ecuador	11740 15115 17890
1300-1400	Radio Luxembourg	15350
1300-1400	WHRI Noblesville, Indiana	9465 11790
1300-1400	WWCR Nashville, TN	15690
1300-1400	WYFR Okeechobee, Florida	6015 _{am} 11580 _{am} 13695 _{eu}
		17750 _{af}
1300-1400	RTV Malaysia, Radio 4	7295 _{do}
1300-1400	SBC Radio 1, Singapore	5010 _{do} 5052 _{do} 11940 _{do}
1300-1400	SLBS, Freetown, Sierra Leone	3316 _{do} 5980 _{do}
1300-1400	Sri Lanka B'casting Corp.	6075 _{as} 9720 _{as}
1300-1400	Voice of Nigeria, Lagos	7255 _{af}
1300-1400	Radio Baijing, China	11855 _{as}
1300-1400	KTBN Salt Lake City, Utah	7510
1300-1400 war	Voice of Peace, Baghdad, Iraq	11860 _{me} 21675 _{me}
1300-1330	Swiss Radio Int'l, Bern	6165 _{eu} 9535 _{eu} 12030 _{eu}
1305-1315 s	Radio Riga, Latvia	15330
1315-1330	Radio Voice of Lebanon, Beirut	6549.5 _{me}
1325-1400 mtwhf	Voice of Kenya, Nairobi	4934 _{do}
1330-1400	All India Radio, Delhi	9565 _{as} 11760 _{as} 15335 _{as}
1330-1400	Nat'l Radio of Laos, Vientiane	7112 _{as}
1330-1400	Radio Austria Int'l, Vienna	15430 _{as}
1330-1400	Radio Douala, Cameroon	4795 _{do}
1330-1400 a	Radio Republik Indonesia Jayapura	3385 _{do} 6070 _{do}
1330-1400	Swiss Radio Int'l, Bern	7480 _{as} 11695 _{as} 13635 _{as}
		15570 _{as} 17830 _{as} 21695 _{as}
1330-1400	Radio Tashkent, Uzbekistan	7325 _{as} 9540 _{as} 9600 _{as}
		11860 _{as} 15470 _{as}
1330-1400	Radio Australia, Melbourne	5995 _{pa} 6080 _{pa} 7240 _{pa}
		9580 _{pa} 11910 _{as} 17535 _{as}
1330-1400	UAE Radio, Dubai	15320 _{eu} 15435 _{eu} 21605 _{as}
		21675 _{as}
1330-1400	Radio Finland, Helsinki	15400 _{na} 21550 _{na}
1330-1400	Radio Canada Int'l, Montreal	6095 _{as} 9535 _{as} 9700 _{as}
		11795 _{as}
1330-1400	Voice of America	6110 _{as} 9760 _{as} 15155 _{as}
		15425 _{as}
1330-1400	Voice of Vietnam, Hanoi	9840 _{as} 12020 _{as} 15010 _{as}

SELECTED PROGRAMS**Sundays**

- 1305 Christian Science Monitor: Herald of Christian Science. See S 0005.
 1308 Swiss Radio Int'l: Feature. See S 0638.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1338 Swiss Radio Int'l: Feature. See S 0638.

Mondays

- 1300 Radio Korea: Sports Roundup. See M 1145.
 1306 Christian Science Monitor: Encore. See M 0106.
 1308 Swiss Radio Int'l: Dateline. See S 0208.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1334 Christian Science Monitor: Letterbox. See M 0134.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1348 Christian Science Monitor: Religious Article. See M 0148.

Tuesdays

- 1300 Radio Korea: Korean Cultural Variety. See T 1145.
 1306 Christian Science Monitor: One Norway Street. See M 2306.
 1308 Swiss Radio Int'l: Dateline. See S 0208.

- 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1334 Christian Science Monitor: Letterbox. See M 0134.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1348 Christian Science Monitor: Religious Article. See M 0148.

Wednesdays

- 1300 Radio Korea: Pulse of Korea. See W 1145.
 1306 Christian Science Monitor: Curtain Call. See T 2306.
 1308 Swiss Radio Int'l: Dateline. See S 0208.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1334 Christian Science Monitor: Letterbox. See M 0134.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1348 Christian Science Monitor: Religious Article. See M 0148.

Thursdays

- 1300 Radio Korea: Focus This Week. See H 1145.
 1306 Christian Science Monitor: One Norway Street. See M 2306.
 1308 Swiss Radio Int'l: Dateline. See S 0208.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1334 Christian Science Monitor: Letterbox. See M 0134.

- 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1348 Christian Science Monitor: Religious Article. See M 0148.

Fridays

- 1300 Radio Korea: Listeners' Forum. See F 1145.
 1306 Christian Science Monitor: One Norway Street. See M 2306.
 1308 Swiss Radio Int'l: Dateline. See S 0208.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1334 Christian Science Monitor: Letterbox. See M 0134.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1348 Christian Science Monitor: Religious Article. See M 0148.

Saturdays

- 1305 Christian Science Monitor: Herald of Christian Science. See S 0005.
 1308 Swiss Radio Int'l: Dateline. See S 0208.
 1318 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.
 1330 Radio Austria Int'l: Report from Austria. See S 0130.
 1338 Swiss Radio Int'l: Dateline. See S 0208.
 1348 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.

1400 UTC**[10:00 AM EDT/7:00 AM PDT]****FREQUENCIES**

1400-1410	Malawi B'casting Corp., Blantyre	3381 ^{do}	
1400-1410	Radio Juba, Sudan	9540 ^{do}	9550 ^{do}
1400-1425 mtwhf	BRT, Brussels, Belgium	21810 ^{na}	
1400-1430	Radio Canada Int'l, Montreal	11935 ^{eu}	15305 ^{eu} 15315 ^{eu}
		15325 ^{eu}	17795 ^{eu} 17820 ^{eu}
		21545 ^{eu}	
1400-1430	Radio Australia, Melbourne	5995 ^{pa}	6080 ^{pa} 7240 ^{pa}
		9580 ^{pa}	11910 ^{as} 17535 ^{as}
1400-1430	Swiss Radio Int'l, Berne	6165 ^{eu}	9535 ^{eu} 12030 ^{eu}
1400-1430	Radio Douala, Cameroon	4795 ^{do}	
1400-1430	Radio Tirana, Albania	9500 ^{as}	11985 ^{as}
1400-1500	All India Radio, Delhi	9565 ^{as}	11760 ^{as} 15335 ^{as}
1400-1500	Cameroon Radio-TV, Yaounde	4850 ^{na}	
1400-1500	BBC London, England	3955 ^{eu}	5955 ^{na} 5975 ^{af}
		6190 ^{af}	6195 ^{as} 7120 ^{eu}
		7150 ^{af}	7230 ^{eu} 7325 ^{me}
		9410 ^{as}	9600 ^{as} 9740 ^{as}
		11760 ^{eu}	11940 ^{af} 11955 ^{as}
		12095 ^{me}	15070 ^{me} 15220 ^{pa}
		15310 ^{me}	15360 ^{af} 15400 ^{af}
		15420 ^{af}	15590 ^{me} 17640 ^{af}
		17790 ^{me}	17830 ^{af} 17885 ^{af}
		21470 ^{af}	21660 ^{af} 21715 ^{af}
1400-1500 s	Radio Canada Int'l, Montreal	11955	17820
1400-1500	WRNO New Orleans	15420 ^{na}	(irregular)
1400-1500	CFCX Montreal	6005 ^{do}	
1400-1500	Radio Moscow World Service	6000 ^{va}	9705 ^{va} 9780 ^{va}
		9875 ^{va}	11840 ^{va} 15180 ^{va}
		15280 ^{va}	15375 ^{va} 15435 ^{va}
		15485 ^{va}	15520 ^{va} 17565 ^{va}
		17605 ^{va}	17780 ^{va} 17790 ^{va}
		17810 ^{va}	17840 ^{va} 17870 ^{va}
		17880 ^{va}	21785 ^{va}
1400-1500	FEBC Radio Int'l, Philippines	11850 ^{as}	
1400-1500	King of Hope, Lebanon	6280 ^{me}	
1400-1500	Radio 1, Accra, Ghana ¹	4915 ^{do}	
1400-1500	Radio 2, Accra, Ghana	7295 ^{do}	
1400-1500	Radio France Int'l, Paris	11910 ^{as}	17650 ^{as} 21765 ^{as}
1400-1500	Radio Beijing, China	7405 ^{am}	
1400-1500	Radio Beijing, China	4200 ^{as}	11815 ^{as} 15135 ^{as}
		15165 ^{as}	

1400-1500	Radio Korea, Seoul, S. Korea	9570 ^{as}	
1400-1500	Radio Luxembourg	15350 ^{om}	
1400-1500	Radio Nigeria, Lagos	4990 ^{do}	7285 ^{do}
1400-1500 sa	Radio Tanzania, Dar es Salaam	5985 ^{af}	9684 ^{af} 11765 ^{af}
1400-1500	FEBC Manila, Philippines	11685 ^{pa}	
1400-1500	WWCR Nashville, Tennessee	15690 ^{am}	
1400-1500	KTBN Salt Lake City, Utah	7510	
1400-1500	WYFR Okeechobee, Florida	6015 ^{na}	11580 ^{sa} 17750 ^{af}
1400-1500	Christian Science World Svc	9530 ^{pa}	13625 ^{pa} 13760 ^{pa}
		15610 ^{pa}	21670 ^{pa}
1400-1500	HCJB Quito, Ecuador	15115 ^{na}	17890 ^{na} 25950 ^{na}
1400-1500	CFRX Toronto	6070 ^{do}	
1400-1500	Radio Japan, Tokyo	9535 ^{am}	11815 ^{as} 11865 ^{as}
1400-1500	WHRI Noblesville, Indiana	9465	11790
1400-1500	VLW6 Wanneroo, Australia	6140	
1400-1500	RTV Malaysia, Radio 4	7295 ^{do}	
1400-1500	SBC Radio 1, Singapore	5010 ^{do}	5052 ^{do} 11940 ^{do}
1400-1500	SLBS, Freetown, Sierra Leone	3316 ^{do}	5980 ^{do}
1400-1500	Sri Lanka B'casting Corp.	6075 ^{as}	9720 ^{as}
1400-1500	Voice of America, Washington	6110 ^{as}	7125 ^{as} 9645 ^{as}
		9760 ^{as}	15160 ^{as} 15205 ^{as}
		15395 ^{as}	15425
1400-1500 mtwhf	Voice of Kenya, Nairobi	4934 ^{do}	
1400-1500	Voice of Nigeria, Lagos	7255 ^{af}	
1405-1430	Radio Finland, Helsinki	6120 ^{eu}	11755 ^{eu} 11820 ^{eu}
		15185 ^{eu}	21550 ^{eu}
1415-1500	BBS, Thimphu, Bhutan	5023 ^{do}	
1420-1500	Radio Jordan, Amman	9560 ^{??}	
1430-1500	Radio Austria Int'l, Vienna	6155 ^{eu}	11780 ^{as} 13730 ^{eu}
		21490 ^{va}	
1430-1500	Radio Australia, Melbourne	5995 ^{pa}	6080 ^{pa} 7240 ^{pa}
		9580 ^{pa}	11910 ^{as} 15320 ^{as}
		17630 ^{as}	
1430-1500 mtwhf	Radio Douala, Cameroon	4795 ^{do}	
1430-1500	Radio Sofia, Bulgaria	11765 ^{af}	17780 ^{af} 17825 ^{af}
1430-1500	Radio Netherlands, Hilversum	5955 ^{eu}	13770 ^{eu} 15150 ^{eu}
		17575 ^{eu}	17605 ^{eu} 21480 ^{eu}
1430-1500	Voice of Myanmar, Burma	5990 ^{do}	
1430-1500	Guizhou PBS, Guiyang, China ⁴	3260 ^{do}	7275 ^{do}
1435-1450	Nei Mongol PBS, Hohhot, China	3970 ^{do}	7105 ^{do}
1445-1500 smwha	Ulaanbaatar Radio, Mongolia	9575 ^{as}	13780 ^{as}
1445-1500	Vatican Radio, Vatican City	6248 ^{eu}	9645 ^{eu} 11740 ^{eu}

SELECTED PROGRAMS**Sundays**

- 1401 BBC: Feature. The current series is a rerun of "The Making Of The Middle East" (through August 4th).
 1405 Christian Science Monitor: Herald of Christian Science. See S 0005.
 1415 Radio Korea: Echoes of Korean Music. See S 1115.
 1430 BBC: Anything Goes. Bob Holness presents a variety of music and other recordings.
 1430 Radio Austria Int'l: Austrian Shortwave Panorama. See S 1130.
 1435 Radio Korea: Shortwave Feedback. See S 1135.

Mondays

- 1400 BBC (East Asia): Dateline East Asia. The political and economic affairs of the Pacific rim.
 1405 BBC: Outlook. Conversation, controversy, and color from the UK and the world.
 1406 Christian Science Monitor: News Focus. See M 0006.
 1415 Radio Korea: News Commentary. See S 0015.
 1420 Radio Korea: Seoul Calling. See M 1120.
 1430 BBC: Off The Shelf. See M 0430.
 1430 Radio Austria Int'l: Report from Austria. See S 0130.
 1434 Christian Science Monitor: Home Forum. See M 0034.
 1440 Radio Korea: Let's Learn Korean! See M 1140.
 1445 BBC: Talks. Live play-by-play from Wimbledon airs on the 1st, with various talks from the 8th on.
 1445 Radio Korea: Sports Roundup. See M 1145.

Tuesdays

- 1400 BBC (East Asia): Dateline East Asia. See M 1400.

- 1405 BBC: Outlook. See M 1405.
 1406 Christian Science Monitor: News Focus. See M 0006.
 1415 Radio Korea: News Commentary. See S 0015.
 1420 Radio Korea: Seoul Calling. See M 1120.
 1430 BBC: Off The Shelf. See M 0430.
 1430 Radio Austria Int'l: Report from Austria. See S 0130.
 1434 Christian Science Monitor: Kaleidoscope. See M 1634.
 1440 Radio Korea: Let's Learn Korean! See M 1140.
 1445 BBC: Classical Music. See M 0145.
 1445 Radio Korea: Korean Cultural Variety. See T 1145.

Wednesdays

- 1400 BBC (East Asia): Dateline East Asia. See M 1400.
 1405 BBC: Outlook. See M 1405.
 1406 Christian Science Monitor: News Focus. See M 0006.
 1415 Radio Korea: News Commentary. See S 0015.
 1420 Radio Korea: Seoul Calling. See M 1120.
 1430 BBC: Off The Shelf. See M 0430.
 1430 Radio Austria Int'l: Report from Austria. See S 0130.
 1434 Christian Science Monitor: Kaleidoscope. See M 1634.
 1440 Radio Korea: Let's Learn Korean! See M 1140.
 1445 BBC: Good Books. See M 0315.
 1445 Radio Korea: Pulse of Korea. See W 1145.

Thursdays

- 1400 BBC (East Asia): Dateline East Asia. See M 1400.
 1405 BBC: Outlook. See M 1405.
 1406 Christian Science Monitor: News Focus. See M 0006.
 1415 Radio Korea: News Commentary. See S 0015.
 1420 Radio Korea: Seoul Calling. See M 1120.

- 1430 BBC: Off The Shelf. See M 0430.
 1430 Radio Austria Int'l: Report from Austria. See S 0130.
 1434 Christian Science Monitor: Kaleidoscope. See M 1634.
 1440 Radio Korea: Let's Learn Korean! See M 1140.
 1445 BBC: Recording Of The Week. See S 0315.
 1445 Radio Korea: Focus This Week. See H 1145.

Fridays

- 1400 BBC (East Asia): Dateline East Asia. See M 1400.
 1405 BBC: Outlook. See M 1405.
 1406 Christian Science Monitor: News Focus. See M 0006.
 1415 Radio Korea: News Commentary. See S 0015.
 1420 Radio Korea: Let's Sing Together. See F 1120.
 1430 BBC: Off The Shelf. See M 0430.
 1430 Radio Austria Int'l: Report from Austria. See S 0130.
 1434 Christian Science Monitor: Kaleidoscope. See M 1634.
 1445 BBC: Talks. See S 0445.
 1445 Radio Korea: Listeners' Forum. See F 1145.

Saturdays

- 1401 BBC: Sportsworld. Shortwave's "Wide World Of Sports" with Paddy Feeny.
 1405 Christian Science Monitor: Herald of Christian Science. See S 0005.
 1415 Radio Korea: News Commentary. See S 0015.
 1420 Radio Korea: Sites and Sounds. See S 0020.
 1430 Radio Austria Int'l: Austrian Coffeetable. See A 1130.
 1435 Radio Korea: From Us to You. See S 0035.

1500 UTC**[11:00 AM EDT/8:00 AM PDT]****FREQUENCIES**

1500-1515	smwha Ulaanbaatar Radio, Mongolia	9575 ^{as}	13780 ^{as}
1500-1525	Radio Netherlands, Hilversum	5955 ^{eu}	13770 ^{eu} 15150 ^{eu}
		17575 ^{ee}	17605 ^{eu} 21480 ^{eu}
1500-1530	Radio Romania Int'l, Bucharest	11775 ^{as}	11940 ^{as} 15250 ^{as}
		15335 ^{as}	17720 ^{as} 17745 ^{as}
1500-1530	Radio Canada Int'l, Montreal	11935 ^{eu}	15305 ^{eu} 15325 ^{eu}
		17820 ^{eu}	21545 ^{eu}
1500-1530 as	Radio Norway, Oslo	15355 ^{na}	17790 ^{na}
1500-1530	Radio Australia, Melbourne	5995 ^{pa}	6060 ^{pa} 6080 ^{pa}
		7240 ^{pa}	9580 ^{pa} 11910 ^{as}
		15320 ^{as}	17630 ^{as}
1500-1530 sa	Radio Tanzania, Dar es Salaam	5985 ^{af}	9684 ^{af} 11765 ^{af}
1500-1550	Deutsche Welle, Köln, Germany	9735 ^{af}	11965 ^{af} 13610 ^{af}
		17735 ^{af}	17765 ^{af} 21600 ^{af}
1500-1555	FEBA Seychelles	11865 ^{af}	
1500-1600 s	Radio Canada Int'l, Montreal	11955	17820
1500-1600	WWCR Nashville, Tennessee	15690 ^{am}	
1500-1600 whfa	FEBA Seychelles	9590 ^{as}	15330 ^{af}
1500-1600	Voice of America, Washington	7125 ^{as}	9645 ^{as} 9700 ^{as}
		15205 ^{va}	15260 ^{as} 15395 ^{as}
1500-1600	BBC London, England	3955 ^{eu}	5955 ^{na} 5975 ^{af}
		6190 ^{af}	6195 ^{as} 7120 ^{eu}
		7150 ^{af}	7230 ^{eu} 7325 ^{me}
		9410 ^{as}	9515 ^{as} 9740 ^{as}
		11775 ^{na}	11940 ^{af} 11955 ^{as}
		12095 ^{me}	15070 ^{me} 15260 ^{pa}
		15310 ^{me}	15360 ^{af} 15400 ^{af}
		15420 ^{af}	15590 ^{me} 17640 ^{af}
		17790 ^{me}	17830 ^{af} 17885 ^{af}
		21470 ^{af}	21660 ^{af} 21715 ^{af}
1500-1600	CFRX Toronto	6070 ^{do}	
1500-1600	CFCX Montreal	6005 ^{do}	
1500-1600	Radio Japan, Tokyo	11865 ^{am}	21700 ^{eu}
1500-1600	KTWR Guam	11650 ^{as}	
1500-1600	KNLS Anchorage Point, Alaska	9615 ^{as}	
1500-1600	Voice of Myanmar, Burma	5990 ^{do}	
1500-1600	Radio Moscow World Service	6000 ^{va}	9705 ^{va} 9780 ^{va}
		9875 ^{va}	11840 ^{va} 15180 ^{va}
		15280 ^{va}	15345 ^{va} 15325 ^{va}
		15485 ^{va}	15520 ^{va} 17565 ^{va}
		17605 ^{va}	17670 ^{va} 17790 ^{va}
		17810 ^{va}	17840 ^{va} 17870 ^{va}
		17880 ^{va}	21785 ^{va} 21845 ^{as}
1500-1600	Cameroon Radio-TV, Yaounde	4850 ^{do}	

1500-1600	FEBC Radio Int'l, Philippines	11685 ^{as}	
1500-1600	FEBA, Mahe, Seychelles	9590 ^{as}	11865 ^{as} 15330 ^{as}
1500-1600	Radio 1, Accra, Ghana ¹	4915 ^{do}	
1500-1600	Radio 2, Accra, Ghana	7295 ^{do}	
1500-1600	Radio Beijing, China	7405 ^{am}	
1500-1600	Radio Beijing, China	4200 ^{as}	11815 ^{as} 15165 ^{as}
1500-1600	Radio Luxembourg	15350 ^{om}	
1500-1600	Radio Nigeria, Lagos	4990 ^{do}	7285 ^{do}
1500-1600	KTWR Guam	11650 ^{as}	
1500-1600	Radio Pyongyang, North Korea	9325 ^{va}	9640 ^{va} 9977 ^{va}
		11760 ^{va}	
1500-1600	Christian Science World Svc	9530 ^{pa}	13625 ^{pa} 13760 ^{pa}
		15610 ^{pa}	21670 ^{pa}
		4880 ^{do}	
1500-1600	Radio Bangladesh	15590 ^{na}	
1500-1600	KTBN Salt Lake City, Utah	11580 ^{na}	11830 ^{na} 17750 ^{af}
1500-1600	WYFR Okeechobee, Florida	15105 ^{na}	21840 ^{sa}
1500-1600	WHRI Noblesville, Indiana	7230 ^{af}	15210 ^{af} 15270 ^{af}
1500-1600	Radio RSA, South Africa	15115 ^{na}	17890 ^{na} 21455 ^{na}
1500-1600	HCJB Quito, Ecuador	25950 ^{na}	
		15420 ^{na}	
1500-1600	WRNO New Orleans	7295 ^{do}	
1500-1600	RTV Malaysia, Radio 4	5010 ^{do}	5052 ^{do} 11940 ^{do}
1500-1600	SBC Radio 1, Singapore	3316 ^{do}	5980 ^{do}
1500-1600	SLBS, Freetown, Sierra Leone	6075 ^{as}	9720 ^{as}
1500-1600	Sri Lanka B'casting Corp.	9560 ^{af}	
1500-1600	Voice of Ethiopia, Addis Ababa	4934 ^{do}	
1500-1600 mtwhf	Voice of Kenya, Nairobi	7255 ^{af}	
1500-1600	Voice of Nigeria, Lagos	11645 ^{eu}	15550 ^{am} 17525 ^{am}
1530-1540 mtwhfa	Voice of Greece, Athens	9505 ^{af}	11880 ^{af} 17895 ^{af}
1530-1600	Radio Zambia Int'l, Lusaka ¹	17875 ^{na}	21500 ^{na}
1530-1600	Radio Sweden, Stockholm	5985 ^{af}	9684 ^{af} 11765 ^{af}
1530-1600	Radio Tanzania, Dar es Salaam	9500 ^{af}	11835 ^{af}
1530-1600	Radio Tirana, Albania	13685 ^{af}	15430 ^{af} 17830 ^{af}
1530-1600	Swiss Radio Int'l, Bern	21630 ^{af}	
1530-1600	Radio Australia, Melbourne	5995 ^{pa}	6060 ^{pa} 6080 ^{pa}
		7240 ^{pa}	9580 ^{pa} 11800 ^{pa}
		11910 ^{as}	12000 ^{pa} 13745 ^{as}
		15320 ^{as}	
1530-1600	Sudan Nat'l B'casting Corp.	9540 ^{do}	9550 ^{do} 11635 ^{do}
1530-1600 mtwha	Vatican Radio, Vatican City	6185 ^{eu}	
1545-1600 mtwhf	Radiodiffusion Nationale de la Republique du Burundi, Bujumbura	6140 ^{af}	
1545-1600	Vatican Radio, Vatican City	11715 ^{as}	15090 ^{as} 17870 ^{as}
1555-1600 a	FEBA Seychelles	11865 ^{af}	

SELECTED PROGRAMS**Sundays**

1500 BBC (Africa): African Perspective. See S 0430.
 1505 Christian Science Monitor: Herald of Christian Science. See S 0005.
 1515 BBC: Concert Hall. Recordings from the world's concert halls.
 1538 Swiss Radio Int'l: Feature. See S 0638.

Mondays

1506 Christian Science Monitor: Encore. See M 0106.
 1515 BBC (Africa): Focus On Africa. See M 0430.
 1515 BBC: Feature/Drama. See M 0101.
 1534 Christian Science Monitor: Letterbox. See M 0134.
 1538 Swiss Radio Int'l: Dateline. See S 0208.
 1548 Christian Science Monitor: Religious Article. See M 0148.

Tuesdays

1506 Christian Science Monitor: One Norway Street. See M 2306.
 1515 BBC (Africa): Focus On Africa. See M 0430.
 1515 BBC: A Jolly Good Show. Dave Lee Travis presents listener rock music requests.
 1534 Christian Science Monitor: Letterbox. See M 0134.
 1538 Swiss Radio Int'l: Dateline. See S 0208.
 1548 Christian Science Monitor: Religious Article. See M 0148.

Wednesdays

1506 Christian Science Monitor: Curtain Call. See T

2306.
 1515 BBC (Africa): Focus On Africa. See M 0430.
 1515 BBC: Talks. See M 2315.
 1530 BBC: Comedy Show (except July 31st: "Two Cheers For July"). The BBC's regular half-hour spot of British humor.
 1534 Christian Science Monitor: Letterbox. See M 0134.
 1538 Swiss Radio Int'l: Dateline. See S 0208.
 1548 Christian Science Monitor: Religious Article. See M 0148.

Thursdays

1506 Christian Science Monitor: One Norway Street. See M 2306.
 1515 BBC (Africa): Focus On Africa. See M 0430.
 1515 BBC: Music With Matthew. Brian Matthew with classical music selections.
 1534 Christian Science Monitor: Letterbox. See M 0134.
 1538 Swiss Radio Int'l: Dateline. See S 0208.
 1548 Christian Science Monitor: Religious Article. See M 0148.

Fridays

1506 Christian Science Monitor: One Norway Street. See M 2306.
 1515 BBC (Africa): Focus On Africa. See M 0430.
 1515 BBC: Music Review. See H 2315.
 1534 Christian Science Monitor: Letterbox. See M 0134.
 1538 Swiss Radio Int'l: Dateline. See S 0208.
 1548 Christian Science Monitor: Religious Article. See M 0148.

Saturdays

1500 BBC (Africa): Spice Taxi. See A 0430.
 1505 Christian Science Monitor: Herald of Christian Science. See S 0005.
 1515 BBC: Sportsworld. See A 1401.
 1538 Swiss Radio Int'l: Dateline. See S 0208.
 1548 Swiss Radio Int'l: Swiss Shortwave Merry-Go-Round. See S 0218.



Misha Glenny is the BBC's correspondent in central Europe

1600 UTC**[12:00 PM EDT/9:00 AM PDT]****FREQUENCIES**

1600-1605	SBC Radio 1, Singapore	5052 ^{do}	11940 ^{do}
1600-1610	Malawi B'casting Corp., Blantyre	3381 ^{do}	
1600-1610	Radio Lesotho, Maseru	4800 ^{do}	
1600-1610	Vatican Radio, Vatican City	11715 ^{as}	15090 ^{as} 17870 ^{as}
1600-1615 sa	Radiodiffusion Nationale de la Republique du Burundi, Bujumbura	6140 ^{af}	
1600-1630	Radio Pakistan, Islamabad	13665 ^{me} 15605 ^{me} 17555 ^{me}	
		17895 ^{af} 21480 ^{af} 21530 ^{me}	
1600-1630	Radio Sofia, Bulgaria	11735 ^{af}	11840 ^{af} 15370 ^{af}
1600-1630 mtwhf	Vatican Radio, Vatican City ^{ml}	6248 ^{eu} 7250 ^{eu} 9645 ^{eu}	
1600-1630	Voice of America, Washington	3980 ^{eu} 7125 ^{as} 9645 ^{as}	
		9700 ^{va} 15205 ^{va} 15260 ^{as}	
		15395 ^{as}	
1600-1630	Voice of Vietnam, Hanoi	9840 ^{eu} 12020 ^{eu} 15010 ^{eu}	
1600-1630	Radio Australia, Melbourne	6080 ^{pa} 7240 ^{pa} 9580 ^{pa}	
		11880 ^{as} 11910 ^{as} 12000 ^{as}	
		13745 ^{pa} 15320 ^{pa}	
1600-1630	Radio Canada Int'l, Montreal	11935 ^{eu} 15305 ^{eu} 15325 ^{eu}	
		17820 ^{eu} 21545 ^{eu}	
1600-1630 as	Radio Norway, Oslo	21705 ^{me}	
1600-1630 mtwhf	Radio Portugal, Lisbon	21530 ^{me}	
1600-1635	KTWR Guam	11650 ^{as}	
1600-1640	UAE Radio, Dubai	15320 ^{af}	15435 ^{eu} 21605 ^{eu}
	United Arab Emirates	21675 ^{af}	
1600-1650	Deutsche Welle, Koln, Germany	6170 ^{as} 7225 ^{as} 15105 ^{as}	
		15415 ^{as} 15595 ^{as} 17810 ^{as}	
		21680 ^{as}	
1600-1700	BSKSA Saudi Arabia	9705 ^{eu}	9720 ^{eu}
1600-1700	Radio 1, Accra, Ghana ¹	4915 ^{bb}	
1600-1700	Radio 2, Accra, Ghana	7295 ^{do}	
1600-1700	Radio Beijing, China	4130 ^{af}	9570 ^{af} 15110 ^{af}
		15130 ^{af}	
1600-1700	BBC London, England	3955 ^{eu} 5955 ^{na} 5975 ^{af}	
		6190 ^{af} 6195 ^{as} 7120 ^{eu}	
		7150 ^{af} 7230 ^{eu} 7325 ^{me}	
		9410 ^{as} 9515 ^{as} 9740 ^{as}	
		11775 ^{na} 11940 ^{af} 11955 ^{as}	
		12095 ^{me} 15070 ^{me} 15260 ^{pa}	
		15310 ^{me} 15360 ^{af} 15400 ^{af}	
		15420 ^{af} 15590 ^{me} 17640 ^{af}	
		17705 ^{me} 17830 ^{af} 17885 ^{af}	
		21470 ^{af} 21660 ^{af} 21715 ^{af}	
1600-1700	KSDA Guam	11980 ^{as}	
1600-1700	TWR Swaziland	9600 ^{af}	
1600-1700	CFRX Toronto	6070 ^{do}	
1600-1700	CFCX Montreal	6005 ^{do}	
1600-1700	Voice of the Somali People	6320 ^{do}	
1600-1700	Radio Moscow World Service	6000 ^{va} 9705 ^{va} 9780 ^{va}	

1600-1700	Radio Korea, Seoul, S. Korea	9875 ^{va} 11840 ^{va} 15175 ^{va}	
1600-1700	Radio Luxembourg	15280 ^{va} 15325 ^{va} 15485 ^{va}	
1600-1700	Radio Nigeria, Lagos	15465 ^{va} 15520 ^{va} 17565 ^{va}	
1600-1700	Radio RSA, South Africa	17670 ^{va} 17780 ^{va} 17790 ^{va}	
1600-1700	Radio Tanzania, Dar es Salaam	17810 ^{va} 17840 ^{va} 17870 ^{va}	
1600-1700	Radio Zambia Int'l, Lusaka ¹	17880 ^{va} 21645 ^{va} 21485 ^{as}	
1600-1700	SLBS, Freetown, Sierra Leone	5975 ^{om} 9870 ^{af}	
1600-1700	Sri Lanka B'casting Corp.	15350 ^{om}	
1600-1700 mtwhf	Tristan Radio, Tristan da Cunha	4990 ^{do}	
1600-1700	Voice of America, Washington	7230 ^{af} 15210 ^{af} 15270 ^{af}	
		5985 ^{af} 9684 ^{af} 11765 ^{af}	
		9505 ^{af} 11880 ^{af} 17895 ^{af}	
		3316 ^{do} 5980 ^{do}	
		6075 ^{as} 9720 ^{as}	
1600-1700	WRNO New Orleans, Louisiana	3290 ^{do}	
1600-1700	KTBN Salt Lake City, Utah	9575 ^{af} 11920 ^{af} 15410 ^{af}	
1600-1700	WWCR Nashville, Tennessee	15580 ^{af} 17800 ^{af} 21625 ^{af}	
1600-1700	WHRI Noblesville, Indiana	15420	
1600-1700	WYFR Okeechobee, Florida	15590 ^{am}	
		15690 ^{am}	
		15105 ^{am} 17830 ^{am}	
		11580 ^{am} 11830 ^{am} 15355 ^{am}	
		17750 ^{af} 21525 ^{eu} 21615 ^{af}	
		11705 ^{af} 12015 ^{af} 6175 ^{eu}	
		15530 ^{me} 17620 ^{af} 17795 ^{af}	
		17850 ^{af}	
1600-1700	Christian Science WorldSvc	11580 ^{as} 13625 ^{as} 15610 ^{am}	
		17555 ^{am} 21640 ^{af}	
1600-1700 mtwhf	Voice of Kenya, Nairobi	4934 ^{do}	
1600-1700	Voice of Nigeria, Lagos	7255 ^{af}	
1610-1615 mtwhf	Radio Botswana, Gaborone	5955 ^{af} 7255 ^{af}	
1615-1630 s	Radiodiffusion Nationale de la Republique du Burundi, Bujumbura	6140 ^{af}	
1615-1630 mh	Radio Budapest, Hungary	7220 ^{eu} 9585 ^{eu} 9835 ^{eu}	
		11910 ^{eu} 15160 ^{eu} 15220 ^{eu}	
1615-1700	Swiss Radio Int'l, Bern ¹	11955 ^{eu}	
1630-1700	Radio Austria, Vienna	6155 ^{eu} 11780 ^{as} 13730 ^{eu}	
		21490 ^{eu}	
1630-1700	Radio Canada Int'l, Montreal	7150 ^{as} 9555 ^{as}	
1630-1700	Radio Australia, Melbourne	6060 ^{pa} 6080 ^{pa} 7240 ^{pa}	
		9580 ^{pa} 11880 ^{as} 11910 ^{as}	
		12000 ^{pa} 13745 ^{pa}	
		6020 ^{af} 15570 ^{af}	
1630-1700 mtwhfa	Radio Netherlands	15255 ^{af}	
1630-1700	Radio Cairo, Egypt	21455	
1630-1700	HCJB Quito, Ecuador	21455	
1630-1700 mwf	Alma Ata Radio, USSR	5035 ^{do} 5915 ^{do} 6135 ^{do}	
1630-1700	RTV Rwandilase, Kigali, Rwanda	3330	6055
1630-1700 mtwhf	RTV Morocco, Rabat	15335 ^{af} 15360 ^{af} 17595 ^{af}	
1630-1700	Voice of America, Washington	7125 ^{as} 9645 ^{as} 9700 ^{va}	
		11740 ^{va} 15205 ^{va} 15245 ^{va}	
		15260 ^{as} 15395 ^{va} 3980 ^{eu}	
		6040 ^{eu}	

SELECTED PROGRAMS**Sundays**

- 1605 Christian Science Monitor: The Sunday Service. A religious service from the First Church of Christ, Scientist, in Boston.
- 1615 BBC: Feature. See S 0230.
- 1615 Radio Korea: Echoes of Korean Music. See S 1115.
- 1635 Radio Korea: Shortwave Feedback. See S 1135.
- 1645 BBC: Letter From America. See S 0545.

Mondays

- 1606 Christian Science Monitor: News Focus. See M 0006.
- 1615 BBC: New Ideas. Innovative developments in technology and new products.
- 1615 Radio Korea: News Commentary. See S 0015.
- 1620 Radio Korea: Seoul Calling. See M 1120.
- 1634 Christian Science Monitor: Kaleidoscope. News features and special segments on a variety of topics.
- 1635 BBC: Talks. This month sees "Writers In A Nutshell," Cliffs Notes on famous writers (through August 5th).
- 1640 Radio Korea: Let's Learn Korean! See M 1140.
- 1645 BBC: The World Today. A look at a topical aspect of the international scene.
- 1645 Radio Korea: Sports Roundup. See M 1145.

Tuesdays

- 1606 Christian Science Monitor: News Focus. See M 0006.
- 1615 BBC: Megamix. See T 1130.
- 1615 Radio Korea: News Commentary. See S 0015.
- 1620 Radio Korea: Seoul Calling. See M 1120.
- 1634 Christian Science Monitor: Kaleidoscope. See M 1634.
- 1640 Radio Korea: Let's Learn Korean! See M 1140.
- 1645 BBC: The World Today. See M 1645.
- 1645 Radio Korea: Korean Cultural Variety. See T 1145.

Wednesdays

- 1606 Christian Science Monitor: News Focus. See M 0006.
- 1615 BBC: Rock/Pop Music. See T 0630.
- 1615 Radio Korea: News Commentary. See S 0015.
- 1620 Radio Korea: Seoul Calling. See M 1120.
- 1634 Christian Science Monitor: Kaleidoscope. See M 1634.
- 1640 Radio Korea: Let's Learn Korean! See M 1140.
- 1645 BBC: The World Today. See M 1645.
- 1645 Radio Korea: Pulse of Korea. See W 1145.

Thursdays

- 1606 Christian Science Monitor: News Focus. See M 0006.
- 1615 BBC: Network UK. Issues and events affecting

people across the UK.

- 1615 Radio Korea: News Commentary. See S 0015.
- 1620 Radio Korea: Seoul Calling. See M 1120.
- 1634 Christian Science Monitor: Kaleidoscope. See M 1634.
- *640 Radio Korea: Let's Learn Korean! See M 1140.
- 1645 BBC: The World Today. See M 1645.
- 1645 Radio Korea: Focus This Week. See H 1145.

Fridays

- 1606 Christian Science Monitor: News Focus. See M 0006.
- 1615 BBC: Science In Action. The latest news about scientific innovations.
- 1615 Radio Korea: News Commentary. See S 0015.
- 1620 Radio Korea: Let's Sing Together. See F 1120.
- 1634 Christian Science Monitor: Home Forum. See M 0034.
- 1645 BBC: The World Today. See M 1645.
- 1645 Radio Korea: Listeners' Forum. See F 1145.

Saturdays

- 1605 Christian Science Monitor: Herald of Christian Science. See S 0005.
- 1615 BBC: Sportsworld. See A 1401.
- 1615 Radio Korea: News Commentary. See S 0015.
- 1620 Radio Korea: Sites and Sounds. See S 0020.
- 1635 Radio Korea: From Us to You. See S 0035.

1700 UTC

[1:00 PM EDT/10:00 AM PDT]

FREQUENCIES

1700-1705	Radio 2, Accra, Ghana	7295 ^{do}	
1700-1710	Radio Bafoussam, Cameroon ¹	4000 ^{do}	
1700-1715	Kol Israel, Jerusalem	11588 ^{eu}	11655 ^{eu}
1700-1725	Radio Netherlands, Hilversum	6020 ^{af}	15570 ^{af}
1700-1728	SLBS, Freetown, Sierra Leone	3316 ^{do}	5980 ^{do}
1700-1730	Radio Sweden, Stockholm	6065 ^{eu}	9615 ^{eu}
1700-1730	TWR Swaziland	3200 ^{af}	9520 ^{af}
1700-1730	Radio Canada Int'l, Montreal	7235 ^{eu}	9555 ^{eu} 15325 ^{eu}
1700-1730 as	Radio Norway, Oslo	17820 ^{eu}	21545 ^{eu}
1700-1730	Sri Lanka B'casting Corp.	9655 ^{eu}	
1700-1800	Voice of America, Washington	6075 ^{as}	9720 ^{as}
		3980 ^{va}	6040 ^{va}
		7125 ^{as}	9700 ^{va} 9760 ^{va}
		15205 ^{as}	15395 ^{as} 11760 ^{eu} 15245 ^{eu}
		15260 ^{eu}	
1700-1800	B'casting Service of the Kingdom of Saudi Arabia, Riyadh	9705 ^{eu}	9720 ^{eu}
1700-1800	Radio 1, Accra, Ghana ¹	4915 ^{do}	
1700-1800	Radio Africa, Equatorial Guinea	7190 ^{af}	
1700-1800	Radio Beijing, China	4130 ^{af}	8260 ^{af}
		9570 ^{af}	11575 ^{af}
1700-1800	Radio Cairo, Egypt	15255 ^{af}	
1700-1800	Radio Luxembourg	15350 ^{om}	
1700-1800	BBC London, England	3955 ^{eu}	5955 ^{na} 5975 ^{af}
		6190 ^{af}	6195 ^{as} 7120 ^{eu} 7150 ^{af}
		7230 ^{eu}	7325 ^{me} 9410 ^{as} 9515 ^{as}
		9640 ^{as}	11775 ^{eu} 11940 ^{af} 11955 ^{as}
		12095 ^{me}	15070 ^{me} 15260 ^{pa} 15310 ^{me}
		15360 ^{af}	15400 ^{af} 15420 ^{af} 15590 ^{me}
		17640 ^{af}	17790 ^{me} 17830 ^{af} 17880 ^{af}
		21470 ^{af}	21660 ^{af} 21715 ^{af}
1700-1800	WRNO New Orleans, Louisiana	15420	
1700-1800	WWCR Nashville, Tennessee	15690	
1700-1800	KTBN Salt Lake City, Utah	15590	
1700-1800	WHRI Noblesville, Indiana	15105	17830
1700-1800	WYFR Okeechobee, Florida	13760 ^{am}	21500 ^{eu}
1700-1800	Christian Science World Svc	11580 ^{as}	13625 ^{as} 17555 ^{am}
		15610 ^{am}	21640 ^{af}
1700-1800	Radio Moscow World Service	6000 ^{va}	9755 ^{va} 9780 ^{va}
		9875 ^{va}	11840 ^{va} 15185 ^{va} 15280 ^{va}
		15375 ^{va}	15435 ^{va} 15465 ^{va} 15520 ^{va}

1700-1800	WMLK Bethel, Pennsylvania	9465 ^{eu}	
1700-1800	Radio Japan, Tokyo	7140 ^{as}	11815 ^{as} 11865 ^{na}
		15345 ^{me}	
1700-1800	Radio RSA, South Africa	7230 ^{af}	15210 ^{af} 15270 ^{af}
		17710 ^{af}	17835 ^{af}
1700-1800	Radio Tanzania, Dar es Salaam	5985 ^{af}	9684 ^{af} 11765 ^{af}
1700-1800	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af} 17895 ^{af}
1700-1800	mtwhfa RTV Morocco, Rabat	15335 ^{af}	17595 ^{af} 17815 ^{af}
1700-1800	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}
1700-1800	HCJB Quito, Ecuador	21455 ^{am}	21480 ^{am} 25950 ^{na}
1700-1800	CFRX Toronto	6070 ^{do}	
1700-1800	CFCX Montreal	6005 ^{do}	
1700-1800	Radio Australia, Melbourne	6080 ^{pa}	7240 ^{pa} 9580 ^{pa}
		11910 ^{pa}	12000 ^{pa} 13605 ^{as}
		13745 ^{pa}	17630 ^{as}
1700-1800	KSDA Guam	13720 ^{as}	
1700-1800	Radio Pyongyang, North Korea ¹	9325 ^{va}	9640 ^{va} 9977 ^{va}
		11760 ^{va}	
1700-1800	Voice of America, Washington	9575 ^{af}	11920 ^{af} 15410 ^{af}
		15580 ^{af}	17800 ^{af} 21625 ^{af}
1700-1800	mtwhf Voice of Kenya, Nairobi	4934 ^{do}	
1700-1800	Voice of Nigeria, Lagos	7255 ^{af}	
1700-1800	war Voice of Peace, Baghdad, Iraq	6055 ^{me}	11860 ^{me} 21675 ^{me}
1700-1800	Radio 2, Accra, Ghana	3366 ^{do}	
1715-1730	Radio Buea, Cameroon ¹	3970 ^{do}	
1715-1800	Radio Pakistan, Islamabad	11570 ^{eu}	15605 ^{eu}
1728-1800	SLBS, Freetown, Sierra Leone	3316 ^{do}	
1730-1745	Radio Bayrak, Cyprus	6150 ^{va}	
1730-1745	a Radio Douala, Cameroon	4795 ^{do}	
1730-1800	BRT Brussels, Belgium	21815 ^{af}	
1730-1800	Radio Sofia, Bulgaria	11765 ^{af}	17780 ^{af} 17825 ^{af}
1730-1800	TWR Swaziland	3200 ^{af}	
1730-1800	Radio Austria Int'l, Vienna	5945 ^{eu}	6155 ^{eu} 12010 ^{me}
		13730 ^{af}	
1730-1800	Radio Romania Int'l, Bucharest	15365 ^{af}	17720 ^{af} 17745 ^{af}
1730-1800	Vatican Radio, Vatican City	17710 ^{af}	17730 ^{af} 21650 ^{af}
		25950	
1740-1800	Cameroon Radio-TV, Yaounde	4850 ^{do}	
1745-1800	mtwhfa Radio Douala, Cameroon	4795 ^{do}	
1745-1800	RTV Madagascar, Antananarivo	3232 ^{do}	3286 ^{do} 5005 ^{do}

1800 UTC

[2:00 PM EDT/11:00 AM PDT]

FREQUENCIES

1800-1810	Malawi B'casting Corp., Blantyre	3381 ^{do}	
1800-1830 as	Radio Norway, Oslo	17755 ^{na}	
1800-1830	Radio Canada Int'l, Montreal	15260 ^{af}	13670 ^{af} 17820 ^{af}
1800-1830	Radio Sofia, Bulgaria	11765 ^{af}	17780 ^{af} 17825 ^{af}
1800-1830	Radio Cairo, Egypt	15255 ^{af}	
1800-1830	Radio Sweden, Stockholm	6065 ^{va}	9655 ^{va} 11900 ^{va}
1800-1830	RTV Congolaise, Brazzaville ¹	3265 ^{af}	4765 ^{af}
1800-1830	Voice of Vietnam, Hanoi	9840 ^{eu}	12020 ^{eu} 15010 ^{eu}
1800-1840	w Radio Bertoua, Cameroon	4750 ^{do}	
1800-1845	TWR Swaziland	3200 ^{af}	9600 ^{af}
1800-1845	mtwhfa Radio Douala, Cameroon	4795 ^{do}	
1800-1900	All India Radio, Delhi	11935 ^{af}	
1800-1900	B'casting Service of the Kingdom of Saudi Arabia, Riyadh	9705 ^{eu}	9720 ^{eu}
1800-1900	Cameroon Radio-TV, Yaounde	4850 ^{do}	
1800-1900	Radio 1, Accra, Ghana ¹	4915 ^{do}	
1800-1900	Radio 2, Accra, Ghana	7295 ^{do}	
1800-1900	Radio Africa, Equatorial Guinea	7190 ^{af}	
1800-1900	Radio Luxembourg	15350 ^{om}	
1800-1900	Radiobras, Brasilia, Brasil	15265 ^{eu}	
1800-1900	Radio Korea, Seoul	15575 ^{eu}	
1800-1900	KNLS Anchor Point, Alaska	9615 ^{as}	
1800-1900	KTBN Salt Lake City, Utah	15590	
1800-1900	WHRI Noblesville, Indiana	13760 ^{na}	15105 ^{sa}
1800-1900	Voice of Ethiopia, Addis Ababa	9662 ^{af}	
1800-1900	WRNO New Orleans, Louisiana	15420 ^{na}	
1800-1900	WWCR Nashville, Tennessee	15690 ^{na}	
1800-1900	Christian Science World Svc	13625 ^{as}	15610 ^{am} 17555 ^{am}
		21640 ^{af}	
1800-1900	WYFR Okeechobee, Florida	21500 ^{na}	
1800-1900	Radio Mozambique, Maputo	3265 ^{af}	4855 ^{af} 9618 ^{af}
1800-1900	BBC London, England	5975 ^{eu}	9410 ^{eu} 9740 ^{eu}
		11995 ^{pa}	12095 ^{eu} 15070 ^{eu}
		15310 ^{af}	15400 ^{af} 17640 ^{af}
1800-1900	Radio Moscow World Service	7170 ^{va}	7235 ^{va} 7315 ^{va}
		9765 ^{va}	9830 ^{va} 9875 ^{va}
		11630 ^{va}	11840 ^{va} 15375 ^{va} 17655 ^{va}
		17695	21660 ^{va} 21845 ^{va}

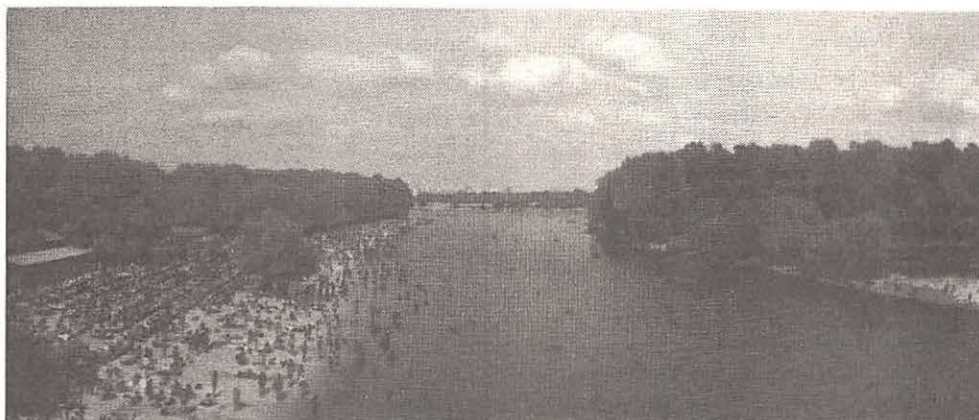
1800-1900	Radio Australia, Melbourne	6080 ^{pa}	7240 ^{pa} 9580 ^{pa}
		9860 ^{pa}	11910 ^{as} 12000 ^{as}
		13605 ^{as}	13745 ^{as}
1800-1900	Radio New Zealand Int'l	13785 ^{pa}	
1800-1900	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}
1800-1900	Radio Tanzania, Dar es Salaam	5985 ^{af}	9684 ^{af} 11765 ^{af}
1800-1900	Radio for Peace Int'l, Costa Rica	13660	21566 25945 ^{all}
1800-1900	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af} 17895 ^{af}
1800-1900	SLBS, Freetown, Sierra Leone	3316 ^{do}	
1800-1900	Voice of America, Washington	9575 ^{af}	11920 ^{af} 15410 ^{af}
		15580 ^{af}	17800 ^{af} 21625 ^{af}
1800-1900	Voice of America, Washington	3980 ^{eu}	6040 ^{va} 9700 ^{va}
		9760 ^{va}	11760 ^{eu} 15205 ^{eu} 15245 ^{eu}
1800-1900	CFRX Toronto	6070 ^{do}	
1800-1900	CFCX Montreal	6005 ^{do}	
1800-1900	WMLK Bethel, Pennsylvania	9465 ^{eu}	
1800-1900	mtwhf Voice of Kenya, Nairobi	4934 ^{do}	
1800-1900	Voice of Peace, Baghdad, Iraq	6055 ^{me}	11860 ^{me} 21675 ^{me}
1800-1830 a	Radio Riga Int'l, Latvia, USSR	5935 ^{eu}	
1815-1830	Kol Israel, Jerusalem	11585 ^{eu}	11655 ^{eu}
1815-1900	Radio Bangladesh, Dhaka	12030 ^{as}	15255 ^{as}
1815-1830	Radio Voice of Lebanon, Beirut	6549 ^{me}	
1830-1900	Radio Afghanistan, Kabul	7310 ^{eu}	9635 ^{eu}
1830-1900 as	Radio Canada Int'l, Montreal	15260 ^{eu}	17820 ^{eu}
1830-1900	Radio Netherlands, Hilversum	6020 ^{af}	15570 ^{af} 17605 ^{af}
		21685 ^{af}	
1830-1900	Radio Sweden, Stockholm	6065 ^{va}	15270 ^{va}
1830-1900	Radio Kuwait (speculative)	11675/13610	
1830-1900	Radio Sofia, Bulgaria	11660 ^{eu}	11720 ^{eu} 15330 ^{eu}
1830-1900	Radio Tirana, Albania	7120 ^{eu}	9480 ^{eu}
1830-1900	Sri Lanka B'casting Corp.	9720 ^{eu}	15120 ^{eu}
1830-1900	Radio Finland, Helsinki	6120 ^{eu}	9550 ^{eu} 11755 ^{eu}
		15185 ^{eu}	
1830-1900	Swiss Radio Int'l, Bern	9885 ^{af}	11955 ^{af}
1840-1850	Voice of Greece, Athens	11645 ^{af}	15650 ^{af}
1845-1900	Ghana B'casting Corp., Accra	6130 ^{af}	
1845-1900	RTV Guinea, Conakry	4900 ^{af}	7125 ^{af}
1845-1900	TWR Swaziland	3200 ^{af}	
1845-1900 s	RTV Mali, Bamako ³	4783 ^{do}	5995 ^{do} 7285 ^{do}
		11960 ^{do}	

1900 UTC

[3:00 PM EDT/12:00 PM PDT]

FREQUENCIES

1900-1915	Radio Tanzania, Dar es Salaam	5985 _{af}	9684 _{af}	11765 _{af}	
1900-1925	Radio Netherlands, Hilversum	6020 _{af}	15570 _{af}	17605 _{af}	
		21685 _{af}			
1900-1930	Kol Israel, Jerusalem	11605 _{na}	15640 _{na}	17630 _{af}	
		17685 _{na}			
1900-1930	Radio Canada Int'l, Montreal	5995 _{eu}	7235 _{eu}	13650 _{eu}	
		15325 _{eu}	17875 _{eu}	21675 _{eu}	
1900-1930 as	Radio Norway, Oslo	15175 _{eu}	17750 _{pa}		
1900-1930 mtwhf	Radio Canada Int'l, Montreal	15260 _{af}	13670 _{af}	17820 _{af}	
1900-1930	Radio Afghanistan, Kabul	7310 _{eu}	9635 _{eu}		
1900-1930 t	Radio Budapest, Hungary	6110 _{eu}	7220 _{eu}	9520 _{eu}	
		9585 _{eu}	9835 _{eu}	11910 _{eu}	
1900-1930	Radio Australia, Melbourne	6080 _{pa}	7240 _{pa}	9580 _{pa}	
		9860 _{pa}	11910 _{as}	12000 _{pa}	
		13605 _{pa}	13745 _{pa}		
1900-1930	Voice of Vietnam, Hanoi	9840 _{eu}	12020 _{eu}	15010 _{eu}	
1900-1945	Cameroon Radio-TV, Yaounde	4850 _{na}			
1900-1950	Deutsche Welle, Köln, Germany	9760 _{af}	11785 _{af}	11810 _{af}	
		13790 _{af}	15350 _{af}	15390 _{af}	
		17810 _{af}			
1900-2000	All India Radio, Delhi	11935 _{af}			
1900-2000	B'casting Service of the Kingdom of Saudi Arabia, Riyadh	9705 _{eu}	9720 _{eu}		
1900-2000	Ghana B'casting Corp., Accra	6130 _{af}			
1900-2000	Radio for Peace Int'l, Costa Rica	13660	21566	25945	all am
1900-2000	Radio 1, Accra, Ghana ¹	4915 _{do}			
1900-2000	WMLK Bethel, Pennsylvania	9465 _{eu}			
1900-2000	Radio 2, Accra, Ghana	7295 _{do}			
1900-2000	HCJB Quito, Ecuador	15270 _{eu}	17790 _{eu}	21455 _{eu}	
		21480 _{eu}	29590 _{eu}		
1900-2000	Radio Africa, Equatorial Guinea	7190 _{af}			
1900-2000	CFRX Toronto	6070 _{do}			
1900-2000	CFCX Montreal	6005 _{do}			
1900-2000	TWR Swaziland	3200 _{af}	3240 _{af}		
1900-2000	Spanish Foreign Radio, Madrid	15375 _{eu}	15395 _{eu}		
1900-2000 mtwhf	RAE Buenos Aires	11710 _{na}			
1900-2000	Radio Algiers, Alger, Algeria	9640 _{me}	15215 _{me}		
1900-2000	Radio Kuwait (speculative)	11675/13610			
1900-2000	Radio Beijing, China	6955 _{af}	9440 _{af}	11515 _{af}	
1900-2000	Radio Havana Cuba	15435 _{eu}			
1900-2000	Radio Luxembourg	15350 _{om}			
1900-2000 smtwhf	Radio New Zealand Int'l	13785 _{pa}			
1900-2000	KTBN Salt Lake City, Utah	15590			
1900-2000	WHRI Noblesville, Indiana	13760	17830		
1900-2000	WRNO New Orleans, Louisiana	15420			
1900-2000	WWCR Nashville, Tennessee	15690			
1900-2000	Christian Science World Svc	13625 _{as}	17555 _{am}	21640 _{af}	
		21780 _{am}			
1900-2000	WYFR Okeechobee, Florida	15355 _{af}	21615 _{eu}		
1900-2000	Radio Nigeria, Lagos	3326 _{do}	4990 _{do}		
1900-2000	Radio Zambia Int'l, Lusaka ¹	9505 _{af}	11880 _{af}	17895 _{af}	
1900-2000 s	RTV Morocco, Rabat	15335 _{af}			
1900-2000	SLBS, Freetown, Sierra Leone	3316 _{do}			
1900-2000	Sri Lanka B'casting Corp.	9720 _{eu}	15120 _{eu}		
1900-2000	Voice of America, Washington	9575 _{af}	11920 _{af}	15410 _{af}	
		15580 _{af}	17800 _{af}	21625 _{af}	
1900-2000	BBC London, England	5975 _{va}	7325 _{va}	9410 _{va}	
		12095 _{va}	15070 _{va}	17885 _{va}	
1900-2000	Voice of America, Washington	3980 _{eu}	6040 _{va}	9525 _{as}	
		9700 _{va}	9760 _{va}	11760 _{va}	
		11870 _{as}	15180 _{as}	15205 _{va}	
		15245 _{as}			
1900-2000 mtwhf	Voice of Kenya, Nairobi	4934 _{do}			
1900-2000	Radio Moscow World Service	11840 _{am}	15185 _{eu}	15375 _{af}	
		17670 _{af}	17695 _{af}		
1900-2000	Voice of Nigeria, Lagos	7255 _{af}			
1910-1915	Radio Botswana, Gaborone	3356 _{af}			
1920-1930	Voice of Greece, Athens	7430	9395		
1920-1930	Radio Buea, Cameroon ¹	3970 _{do}			
1930-1940	Radio Austria Int'l, Vienna	5945 _{eu}	6155 _{eu}	12010 _{me}	
		13730 _{af}			
1930-1940 irr	Radio Burkina, Burkina Faso	4815 _{af}	7230 _{af}		
1930-2000	Radio Budapest, Hungary	6110 _{eu}	7220 _{eu}	9520 _{eu}	
		9585 _{eu}	9835 _{eu}	11910 _{eu}	
1930-2000	Radio Canada Int'l, Montreal	6170 _{eu}	9650 _{eu}	9670 _{eu}	
		13650 _{eu}	15325 _{eu}	17825 _{eu}	
		21675 _{eu}			
1930-2000	Radio Romania Int'l, Bucharest	5990 _{eu}	7195 _{eu}	9690 _{eu}	
1930-2000 tes	KFBS Saipan	9475 _{af}			
1930-2000	Radio Sweden, Stockholm	6065 _{va}	9655 _{va}		
1930-2000	Radio Australia, Melbourne	6060 _{pa}	6080 _{pa}	7240 _{pa}	
		9860 _{pa}	11910 _{pa}	12000 _{as}	
		13605 _{pa}	13745 _{as}		
1930-2000	Voice of the Islamic Republic of Iran, Tehran	6030 _{eu}	9022 _{eu}		
1935-1955	RAI, Rome, Italy	7275 _{eu}	9710 _{eu}	11800 _{eu}	
1935-1945	RTV Togo, Lome	5047 _{af}			
1940-2000 smwha	Ulaanbaatar Radio, Mongolia	11850 _{eu}	12015 _{eu}		
1945-2000 mwf	Tristan Radio, Tristan da Cunha	3290 _{do}			
1950-2000	Sudan Nat'l B'casting Corp.	9540 _{do}	9550 _{do}	11635 _{do}	
1955-2000	Radio Finland, Helsinki	6120 _{eu}	9550 _{eu}	11755 _{eu}	
		15185 _{eu}			



This QSL from Radio Kiev, featuring the beach in Hydropark, was sent to us by Richard Lane, Dawson, IL.

2000 UTC**[4:00 PM EDT/1:00 PM PDT]****FREQUENCIES**

2000-2010 w	Malawi B'casting Corp., Blantyre	3381 ^{do}		
2000-2010 mtwhf	Voice of Kenya, Nairobi	4934 ^{do}		
2000-2010 smwha	Ulaanbaatar Radio, Mongolia	11850 ^{eu}	12015 ^{eu}	
2000-2030 as	Radio Norway, Oslo	15165 ^{na}		
2000-2030	Radio Romania Int'l, Bucharest	5990 ^{eu}	7195 ^{eu}	9690 ^{eu}
2000-2030	Swiss Radio Int'l, Bern ¹	3985 ^{eu}	6165 ^{eu}	9535 ^{eu}
2000-2030 mtwhf	Radio Portugal, Lisbon	11740 ^{eu}		
2000-2030	Radio Australia, Melbourne	6080 ^{pa}	7240 ^{pa}	9860 ^{pa}
		11930 ^{as}	12000 ^{pa}	13605 ^{as}
		13745 ^{pa}	17795 ^{as}	
2000-2030	Voice of Nigeria, Lagos	7255 ^{af}		
2000-2100 tes	KFBS Saipan	9475 ^{af}		
2000-2100	B'casting Service of the Kingdom of Saudi Arabia, Riyadh	9705 ^{eu}	9720 ^{eu}	
2000-2100	King of Hope, Lebanon	6280 ^{me}		
2000-2100	Radio 1, Accra, Ghana ¹	4915 ^{do}		
2000-2100	Radio 2, Accra, Ghana	7295 ^{do}		
2000-2100	KNLS Anchor Point, Alaska	11910 ^{as}		
2000-2100	Radio Africa, Equatorial Guinea	7190 ^{af}		
2000-2100	Radio Kuwait (speculative)	11675 ¹³⁶¹⁰		
2000-2100	Radio Beijing, China	9440 ^{af}	11715 ^{af}	15110 ^{af}
2000-2100	Radio Beijing, China	4130 ^{eu}	8260 ^{eu}	9920 ^{eu}
2000-2100	BBC London, England	11500 ^{eu}		
		5975 ^{va}	7325 ^{va}	9410 ^{va}
		12095 ^{va}	15070 ^{va}	15260 ^{va}
		15400 ^{af}	17885 ^{af}	
2000-2100	CFRX Toronto	6070 ^{do}		
2000-2100	CFCX Montreal	6005 ^{do}		
2000-2100	TWR Swaziland	3200 ^{af}	3240 ^{af}	
2000-2100	Radio Havana Cuba	17705 ^{eu}		
2000-2100	Radio Luxembourg	15350 ^{om}		
2000-2100 smtwhf	Radio New Zealand Int'l	13785 ^{pa}		
2000-2100	R. for Peace Int'l, Costa Rica	7375 ^{na}	13630 ^{na}	15030 ^{na}
		21566 ^{na}		
2000-2100	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}	
2000-2100	Radio Moscow World Service	11840 ^{am}	15185 ^{eu}	17695 ^{af}
2000-2100	Radio Pyongyang, North Korea	9345 ^{va}	9640 ^{va}	9977 ^{va}

2000-2100	KTBN Salt Lake City, Utah	15590		
2000-2100	WHRI Noblesville, Indiana	13760 ^{af}	15105 ^{sa}	
2000-2100	WRNO New Orleans, Louisiana	15420		
2000-2100	WWCR Nashville, Tennessee	15690		
2000-2100	Voice of Turkey, Ankara	9795 ^{eu}		
2000-2100	Christian Science World Svc	9455 ^{as}	13625 ^{pa}	13770 ^{am}
		17555 ^{sa}	15610 ^{eu}	
2000-2100	KVOH Los Angeles, California	17775 ^{am}		
2000-2100	WYFR Okeechobee, Florida	15566 ^{eu}	17612 ^{af}	21525 ^{eu}
		21615 ^{eu}		
2000-2100 s	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af}	17895 ^{af}
2000-2100	SLBS, Freetown, Sierra Leone	3316 ^{do}		
2000-2100 mwf	Tristan Radio, Tristan da Cunha	3290 ^{do}		
2000-2100	Voice of America, Washington	9570 ^{af}	15410 ^{af}	15580 ^{af}
		17800 ^{af}	21485 ^{af}	21625 ^{af}
2000-2100	Voice of America, Washington	3980 ^{eu}	6040 ^{va}	9700 ^{va}
		9760 ^{va}	11760 ^{va}	15205 ^{va}
2000-2100	Voice of Indonesia, Jakarta	7125 ^{as}	9675 ^{as}	11752 ^{as}
		11785 ^{as}		
2005-2100	Radio Damascus, Syria	12085 ^{na}	15095 ^{na}	
2010-2100 sa	Voice of Kenya, Nairobi	4934 ^{do}		
2015-2030	Voix de la Revolution Benin	4870 ^{af}	5025 ^{af}	
2015-2045 sth	Voice of Resistance of Black Cockerel (Angolan clandestine)	9700 ^{af}		
2020-2030 mtwhf	Voice of Greece, Athens	9395 ^{eu}	11645 ^{eu}	
2025-2045	RAI, Rome, Italy	7235 ^{me}	9575 ^{me}	11800 ^{me}
2030-2100	Radio Sofia, Bulgaria	11660 ^{eu}	11720 ^{eu}	15330 ^{eu}
2030-2100	Radio Australia, Melbourne	7240 ^{pa}	9860 ^{pa}	11930 ^{as}
		12000 ^{pa}	13605 ^{as}	13745 ^{pa}
		15320 ^{as}	17795 ^{pa}	
2030-2100	Radio Sweden, Stockholm	6065 ^{na}		
2030-2100	Radio Cairo, Egypt	15375 ^{af}		
2030-2100	Radio Korea, Seoul, s.Korea	6480 ^{eu}	7550 ^{af}	15575 ^{eu}
2030-2100	Radio Netherlands, Hilversum	7285 ^{af}	9860 ^{af}	9895 ^{af}
		11660 ^{af}	13700 ^{af}	
2030-2100	Voice of Vietnam, Hanoi	9840 ^{eu}	12020 ^{eu}	15010 ^{eu}
2045-2100	All India Radio, Delhi	7412 ^{eu}	9665 ^{eu}	9910 ^{eu}
		11620 ^{eu}	11715 ^{eu}	15265 ^{eu}
2050-2100	Vatican Radio, Vatican City	6248 ^{eu}	7250 ^{eu}	

2100 UTC**[5:00 PM EDT/2:00 PM PDT]****FREQUENCIES**

2100-2105	Radio Damascus, Syria	12085 ^{na}	15095 ^{na}	
2100-2110	Malawi B'casting Corp., Blantyre	3381 ^{do}		
2100-2110	Vatican Radio, Vatican City	6248 ^{eu}	7250 ^{eu}	
2100-2115	TWR Swaziland	3240 ^{af}		
2100-2125	Radio Netherlands, Hilversum	7285 ^{af}	9860 ^{af}	9895 ^{af}
		11660 ^{af}	13700 ^{af}	
2100-2130	King of Hope, Lebanon	6280 ^{me}		
2100-2130	Radio Australia, Melbourne	11880 ^{pa}	11930 ^{pa}	13705 ^{pa}
		15160 ^{as}	15320 ^{as}	17795 ^{as}
				21740 ^{as}
2100-2130	Radio Korea, Seoul	6480 ^{eu}	7550 ^{af}	15575 ^{eu}
2100-2130	Radio Budapest, Hungary	6110 ^{eu}	7220 ^{eu}	9520 ^{eu}
		9585 ^{eu}	9835 ^{eu}	11910 ^{eu}
2100-2130	Radio Romania Int'l, Bucharest	5990 ^{eu}	6105 ^{eu}	7105 ^{eu}
		7195 ^{eu}	9690 ^{eu}	
2100-2130 mtwhf	Radio Portugal, Lisbon	15250 ^{af}		
2100-2130	Swiss Radio Int'l, Bern	12035 ^{af}	13635 ^{af}	15525 ^{af}
2100-2130	Swiss Radio Int'l, Berne	3985 ^{eu}	6165 ^{eu}	9535 ^{eu}
		9885 ^{eu}		
2100-2130	Radio Canada Int'l, Montreal	5995 ^{eu}	7235 ^{eu}	13650 ^{eu}
2100-2130	Vatican Radio, Vatican City	17710 ^{af}	17730 ^{af}	21650 ^{af}
2100-2145	Radio Yugoslavia, Belgrade	5960 ^{eu}	11735 ^{na}	
2100-2150	Deutsche Welle, Köln, Germany	9760 ^{as}	9765 ^{as}	11785 ^{as}
		13780 ^{as}	15350 ^{as}	15360 ^{as}
2100-2200	Radio Kiev, Ukrainian SSR	6185 ^{eu}		
2100-2200	Radio 1, Accra, Ghana ¹	4915 ^{do}		
2100-2200	Radio 2, Accra, Ghana	7295 ^{do}		
2100-2200	Radio Africa, Equatorial Guinea	7190 ^{af}		
2100-2200	Radio New Zealand Int'l	13785 ^{pa}		
2100-2200	Radio Baghdad, Iraq	13660 ^{eu}		
2100-2200	Radio Beijing, China	4130 ^{eu}	9920 ^{eu}	11500 ^{eu}
2100-2200	Radio Cairo, Egypt	15375 ^{af}		
2100-2200	SLBC Sri Lanka	15120 ^{as}		
2100-2200	Radio Luxembourg	15350 ^{om}		
2100-2200	R. for Peace Int'l, Costa Rica	7375 ^{na}	13630 ^{na}	15030 ^{na}
		21566 ^{na}		
2100-2200	R. Nacional de Angola, Luanda	3355 ^{af}	9535 ^{af}	
2100-2200	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}	
2100-2200	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af}	17895 ^{af}
2100-2200	SLBS, Freetown, Sierra Leone	3316 ^{do}		
2100-2200 mwf	Tristan Radio, Tristan da Cunha	3290 ^{do}		
2100-2200	Radio Moscow World Service	11840 ^{am}	11675 ^{af}	15500 ^{eu}
		17695 ^{af}	17735 ^{am}	

2100-2200	Voice of America, Washington	15410 ^{af}	15580 ^{af}	17800 ^{af}
		21485 ^{af}	21625 ^{af}	
2100-2200	BBC London, England	5975 ^{va}	7325 ^{va}	9590 ^{na}
		12095 ^{va}	15070 ^{va}	15260 ^{na}
		15400 ^{af}	21660 ^{ca}	
2100-2200	KTBN Salt Lake City, Utah	15590		
2100-2200	WHRI Noblesville, Indiana	13760	17830	
2100-2200	WRNO New Orleans, Louisiana	15420		
2100-2200	WWCR Nashville, Tennessee	15690		
2100-2200	Radio Canada Int'l, Montreal	15325 ^{eu}	17875 ^{eu}	
2100-2200	Christian Science World Svc	9455 ^{as}	13625 ^{pa}	13770 ^{am}
		17555 ^{sa}	15610 ^{eu}	
2100-2200	WYFR Okeechobee, Florida	15566 ^{eu}	17612 ^{af}	21525 ^{eu}
		21615 ^{eu}		
2100-2200	Radio Japan, Tokyo	11815 ^{me}	15230 ^{eu}	15270 ^{eu}
		17810 ^{as}	17890 ^{as}	
2100-2200	CFRX Toronto	6070 ^{do}		
2100-2200	CFCX Montreal	6005 ^{do}		
2100-2200	KVOH Los Angeles, California	17775		
2100-2200	Voice of America, Washington	3980 ^{eu}	6040 ^{va}	9700 ^{va}
		9760 ^{va}	11760 ^{va}	11960 ^{va}
		15185 ^{as}	15205 ^{as}	15245 ^{as}
2100-2200	Voice of Peace, Baghdad, Iraq	6055 ^{me}	11860 ^{me}	21675 ^{me}
2110-2200	Radio Damascus, Syria	12085 ^{na}	15095 ^{na}	
2115-2200	Radio Cairo, Egypt	9900 ^{eu}		
2115-2130 s	R. Republik Indonesia Jayapura	6070 ^{do}		
2130-2145	Radio Buea, Cameroon ¹	3970 ^{do}		
2130-2200	Radio Tirana, Albania	7245 ^{eu}	9480 ^{eu}	
2130-2200	Radio Australia, Melbourne	11930 ^{pa}	13705 ^{pa}	15160 ^{pa}
		15240 ^{pa}	15320 ^{as}	17715 ^{as}
		17795 ^{as}	21740 ^{as}	
2130-2200	Radio Canada Int'l, Montreal	11880 ^{af}	15150 ^{af}	17820 ^{af}
2130-2200	Kol Israel, Jerusalem	11588 ^{eu}	11605 ^{na}	15100 ^{na}
		15640 ^{na}	17575 ^{pa}	17685 ^{na}
		11655 ^{na}	15640 ^{na}	17630 ^{af}
2130-2200	Radio Sofia, Bulgaria	11660 ^{eu}	15330 ^{eu}	
2130-2200	Radio Finland, Helsinki	6120 ^{eu}	11755 ^{eu}	
2130-2200	Radio Vilnius, Lithuania, USSR	6100 ^{eu}	9625 ^{eu}	9710 ^{eu}
2130-2200	UAE Radio, Dubai	11795 ^{na}	13675 ^{na}	15320 ^{na}
		15400 ^{na}		
2130-2200	HCJB Quito, Ecuador	17790 ^{eu}	21455 ^{eu}	21480 ^{eu}
		25950 ^{eu}		
2130-2200 smtwhf	King of Hope, Lebanon	6280 ^{me}		
2145-2200	Cameroon Radio-TV, Yaounde	4850 ^{na}		

2200 UTC

[6:00 PM EDT/3:00 PM PDT]

FREQUENCIES

2200-2210	Radio Bafoussam, Cameroon ¹	4000 ^{do}	
2200-2210	Radio Damascus, Syria	12085 ^{na}	15095 ^{na}
2200-2215	Cameroon Radio-TV, Yaounde	4850 ^{na}	
2200-2215	Radio Zambia Int'l, Lusaka ¹	9505 ^{af}	11880 ^{af} 17895 ^{af}
2200-2218	RTV Congolaise, Brazzaville	4765 ^{do}	5985 ^{do}
2200-2225	BRT, Brussels, Belgium	5910 ^{eu}	9925 ^{eu} 15515 ^{af}
2200-2225	RAI, Rome, Italy	5990 ^{as}	9710 ^{as} 11800 ^{as}
2200-2230	All India Radio, Delhi	7412 ^{eu}	9665 ^{eu} 9910 ^{eu}
		11620 ^{eu}	11715 ^{eu} 15265 ^{eu}
2200-2230	Radio Canada Int'l, Montreal	5960 ^{na}	9755 ^{na} 11905 ^{as}
		13670 ^{ca}	
2200-2230	Radio Beijing, China	3985 ^{eu}	
2200-2230 a	Radio Rep Indonesia Kupang	3385 ^{do}	4805 ^{do}
2200-2230	Radio Prague, Czechoslovakia	5930 ^{eu}	6055 ^{eu} 7345 ^{eu}
2200-2230 s	KGEI San Francisco, California	15280 ^{sa}	
2200-2230	Radio Sweden, Stockholm	6065 ^{va}	
2200-2230	Radio Sofia, Bulgaria	11660 ^{eu}	15330 ^{eu}
2200-2230 as	Radio Norway, Oslo	21705 ^{va}	
2200-2245	Radio Cairo, Egypt	9900 ^{eu}	
2200-2300	DZAS, Metro-Manila, Philippines ¹	6030 ^{do}	
2200-2300	Voice of Turkey, Ankara	7225 ^{eu}	9445 ^{na} 9685 ^{eu}
		17880 ^{as}	
2200-2300	Radio 1, Accra, Ghana ¹	4915 ^{do}	
2200-2300	Radio 2, Accra, Ghana	7295 ^{do}	
2200-2300	Radio for Peace Int'l, Costa Rica	13660	21566 25945 all am
2200-2300 sa	Radio Africa, Equatorial Guinea	7190 ^{af}	
2200-2300	Radio Baghdad, Iraq	13660 ^{eu}	
2200-2300	Radio Havana Cuba	7215 ^{eu}	
2200-2300	Radio Luxembourg	15350 ^{om}	
2200-2300	Radio New Zealand Int'l	17770 ^{pa}	
2200-2300	Radio Nigeria, Lagos	3326 ^{do}	4990 ^{do}
2200-2300 smtwha	RTV Malaysia, Radio 4	7295 ^{do}	
2200-2300	SBC Radio 1, Singapore	5010 ^{do}	5052 ^{do} 11940 ^{do}

2200-2300	KTBN Salt Lake City, Utah	15590	
2200-2300	Voice of the UAE, Abu Dhabi	13605 ^{na}	15305 ^{na} 17855 ^{na}
2200-2300	WHRI Noblesville, Indiana	13760 ^{na}	17830 ^{sa}
2200-2300	Radio Station Peace & Progress	6145 ^{eu}	7360 ^{eu} 9610 ^{eu}
		11980 ^{am}	
2200-2300	CFCX Montreal	6005 ^{do}	
2200-2300	CFRX Toronto	6070 ^{do}	
2200-2300	Radio Moscow N.American Svc	9720 ^{na}	11630 ^{na} 11675 ^{na}
		12040 ^{na}	12060 ^{na} 15355 ^{na}
		15500 ^{na}	15535 ^{na} 17575 ^{na}
2200-2300	WRNO New Orleans, Louisiana	13720 ^{na}	
2200-2300	Radio Australia, Melbourne	11930 ^{pa}	13705 ^{pa} 15160 ^{pa}
		15240 ^{as}	15320 ^{as} 17715 ^{as}
		17795 ^{as}	21740 ^{as}
2200-2300	Voice of Free China, Taiwan	17750 ^{eu}	21720 ^{eu}
2200-2300	WWCR Nashville, Tennessee	15690 ^{na}	
2200-2300	Christian Science World Svc	9465 ^{na}	13625 ^{as} 15405 ^{as}
		17555 ^{sa}	15300 ^{af}
2200-2300	WYFR Okeechobee, Florida	17612 ^{af}	21525 ^{eu}
2200-2300	SLBS, Freetown, Sierra Leone	3316 ^{do}	
2200-2300	Radio Moscow World Service	11630 ^{va}	
2200-2300	Voice of America, Washington	6095 ^{as}	7120 ^{va} 9770 ^{as}
		11760 ^{as}	15185 ^{va} 15215 ^{va}
		15255 ^{as}	15290 ^{as} 15305 ^{va}
		17735 ^{as}	17810 ^{as} 17820 ^{as}
		17885 ^{va}	
2200-2300	BBC London, England	5975 ^{va}	7325 ^{va} 9410 ^{va}
		12095 ^{va}	15070 ^{va} 17885 ^{va}
2205-2300	Vatican Radio, Vatican City	7125 ^{as}	9615 ^{as} 11830 ^{as}
2230-2300	Radio Sofia, Bulgaria	9700 ^{eu}	
2230-2300	Radio Tirana, Albania	7215 ^{eu}	9480 ^{eu}
2230-2300 mtwhf	RTV Congolaise, Brazzaville	4765 ^{do}	
2230-2300	Swiss Radio Int'l, Bern ¹	6190 ^{eu}	
2240-22250	Voice of Greece, Athens	11645 ^{am}	



Klagenfurt, Burgenland, Kärnten
Traditionelle österreichische Klagenfurter
Garnitur
Geschnitten und gebacken von den
Klagenfurter Gebäckbäckern



RADIO ÖSTERREICH
INTERNATIONAL
RADIO AUSTRIA
INTERNATIONAL
RADIO AUTRICHE
INTERNATIONALE
RADIO AUSTRIA
INTERNACIONAL



QSLs from around the world; Left: Radio Austria International courtesy Hugh Hawkins, Pt. Gibson, MS; Center: Radio Beijing courtesy Andrew Hill, Staffordshire, England; Right: Radio New Zealand International courtesy John Flake, Charlotte, NC.

2300 UTC**[7:00 PM EDT/4:00 PM PDT]****FREQUENCIES**

2300-2315	DZAS, Metro-Manila, Philippines ¹	6030do	
2300-2305	Radio 1, Accra, Ghana ¹	4915do	
2300-2305	Radio 2, Accra, Ghana	7295do	
2300-2330	Radio Canada Int'l, Montreal	15455na 11730ca 13670na	
		11940ca 15235sa	
2300-2330	Radio Vilnius, Lithuania	11790na 13645na 15180na	
		15455na 15485na	
2300-2330	Vatican Radio, Vatican City ^{mu}	6185eu	
2300-2330	Kol Israel, Jerusalem	9435na 11605na 15640na	
2300-0000	Radio Australia, Melbourne	11880pa 11930pa 15160as	
		15240as 15320as 17715as	
		17795as 21740as	
2300-0000	AWR Costa Rica	9725ca 11825ca	
2300-0000	Radio Luxembourg	6090om	
2300-0000	Voice of the UAE, Abu Dhabi	13605na 15305na 17855na	
2300-0000	Radio New Zealand Int'l	17770pa	
2300-0000	Radio Pyongyang, North Korea	11700na 13650na	
2300-0000	Radio Thailand, Bangkok	4830as 9655as 11905as	
2300-0000	smtwha RTV Malaysia, Radio 4	7295do	
2300-0000	WRNO New Orleans	13720na	
2300-0000	WHRI Noblesville, Indiana	9495na 13760sa	
2300-0000	KTBN Salt Lake City	15590na	
2300-0000	KSDA Guam	15610as	
2300-0000	Radio Moscow North American	5920na 11675na 12040na	
		15315na 15355na 17670na	
		17735na	
2300-0000	CFCX Montreal	6005na	
2300-0000	CFRX Toronto	6070do	
2300-0000	Christian Science World Svc	9465na 13625as 15405as	
		15300af 17555sa	
2300-0000	smtwha RTV Malaysia, Radio 4	7295do	
2300-2000	SBC Radio 1, Singapore	5010do 5052do 11940do	
2300-0000	SLBS, Freetown, Sierra Leone	3316do	

2300-0000	KTBN Salt Lake City, Utah	15590na	
2300-0000	WHRI Noblesville, Indiana	9495na 13760sa	
2300-0000	WRNO New Orleans, Louisiana	15420na	
2300-0000	WWCR Nashville, Tennessee	15690na	
2300-0000	KSDA Guam	15610as	
2300-0000	Radio Japan, Tokyo	11735eu 11815am 15195as	
		15230am 17810pa 21610as	
2300-0000	Radio Sofia, Bulgaria	11660am 15330am	
2300-0000	Christian Science World Svc	9465na 13625as 15405as	
		15300af 17555sa	
2300-0000	WYFR Okeechobee, Florida	5985na 11915na	
2300-0000	Radio Moscow N.American Svc	9530na 9685na 972na	
		11735na 11860na 11950na	
		12050na 15425na 17605na	
		17665na 17700na 21480na	
		7375na 13630na 15030na	
2300-0000	R. for Peace Int'l, Costa Rica	21566na	
		5975va 7325va 9410va	
2300-0000	BBC London, England	11955pa 12095eu 15070me	
		7120as 9530va 9770as	
2300-0000	Voice of America, Washington	11760na 11905va 11960va	
		15185as 15225va 15290as	
		15305as 15445va 17735as	
		17820as 17885va	
2305-2355	Radio Polonia, Warsaw	7270eu	
2315-0000	All India Radio, Delhi	9535as 9910as 11715as	
		11745as 15110as	
2330-0000	Radio Canada Int'l, Montreal	5960na 9755na 13670na	
2330-0000	Radio Sweden, Stockholm	9695ja 11705ja	
2330-0000	Radio Tirana, Albania	6120na 9760na 11825na	
2330-0000	Radio Budapest, Hungary	6110am 9520am 9585am	
		9835am 11910am 15160am	
2330-0000	BRT Brussels, Belgium	13655na 13720na	
2330-0000	Voice of Vietnam, Hanoi	9840as 12020as 15010as	
2335-2345	smtwhf Voice of Greece, Athens	9425 11645 12105	

SELECTED PROGRAMS**Sundays**

2305 BBC: World Business Review. See S 0530.
 2315 BBC: Letter From America. See S 0545.
 2330 BBC: Feature. See S 1401.

Mondays

2305 BBC: World Business Report. The latest news from the markets worldwide.
 2306 Christian Science Monitor: One Norway Street. Current affairs reports and features, mainly from the United States.
 2315 BBC: Talks. Brief talks on various subjects.
 2330 BBC: Multitrack 1: Top 20. The smash singles on the UK pop music charts.
 2334 Christian Science Monitor: Letterbox. See M 0134.

2348 Christian Science Monitor: Religious Article. See M 0148.

Tuesdays

2305 BBC: World Business Report. See M 2305.
 2306 Christian Science Monitor: Curtain Call. A look at music and the people who write and perform it.
 2315 BBC: Concert Hall. See S 1515.
 2334 Christian Science Monitor: Letterbox. See M 0134.
 2348 Christian Science Monitor: Religious Article. See M 0148.

Wednesdays

2305 BBC: World Business Report. See M 2305.
 2306 Christian Science Monitor: One Norway Street. See M 2306.
 2315 BBC: Good Books. See M 0315.

2330 BBC: Multitrack 2. New pop records, interviews, news, and contests.

2334 Christian Science Monitor: Letterbox. See M 0134.

2348 Christian Science Monitor: Religious Article. See M 0148.

Thursdays

2305 BBC: World Business Report. See M 2305.
 2306 Christian Science Monitor: One Norway Street. See M 2306.
 2315 BBC: Music Review. News and views from the world of classical music.
 2334 Christian Science Monitor: Letterbox. See M 0134.
 2348 Christian Science Monitor: Religious Article. See M 0148.

Fridays

2305 BBC: World Business Report. See M 2305.
 2306 Christian Science Monitor: Encore. See M 0106.
 2315 BBC: Worldbrief. A roundup of the week's news headlines and developments.
 2330 BBC: Multitrack 3. News and releases from the British alternative music scene.
 2334 Christian Science Monitor: Letterbox. See M 0134.
 2348 Christian Science Monitor: Religious Article. See M 0148.

Saturdays

2305 BBC: Words Of Faith. See S 0540.
 2305 Christian Science Monitor: Herald of Christian Science. See S 0005.
 2310 BBC: Book Choice. See H 0140.
 2315 BBC: A Jolly Good Show. See T 1515.



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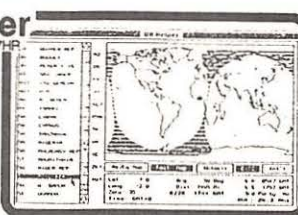
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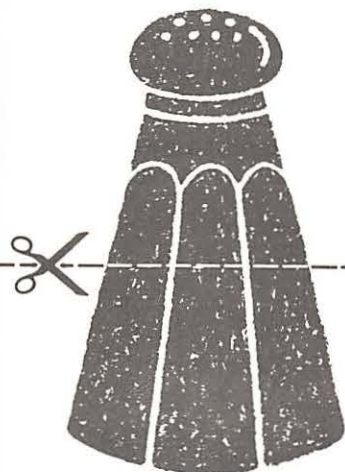
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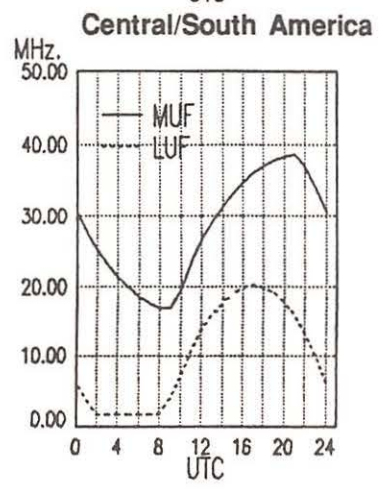
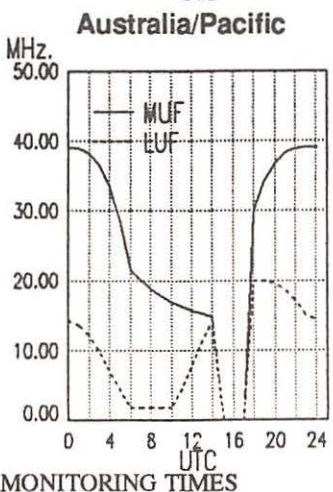
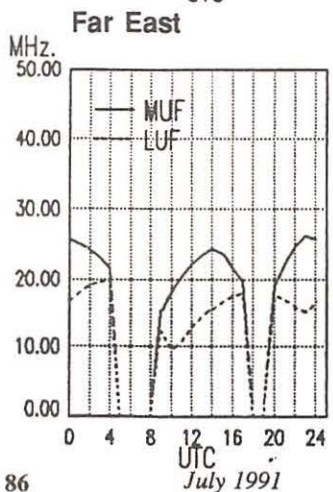
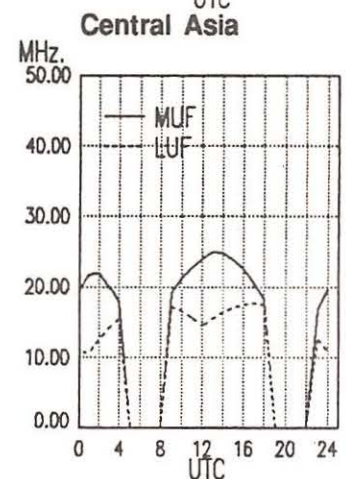
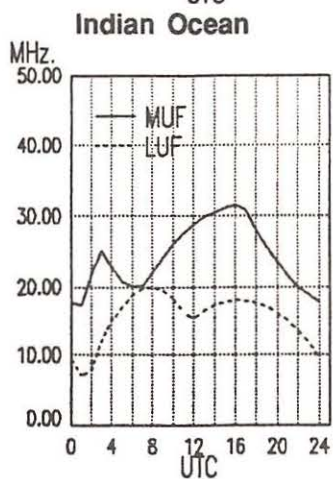
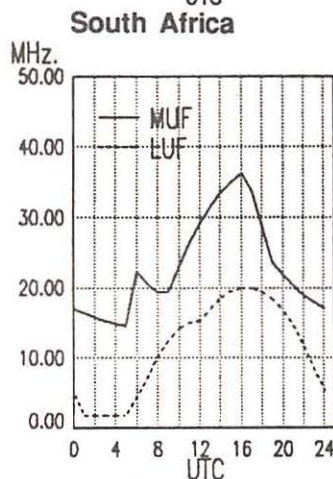
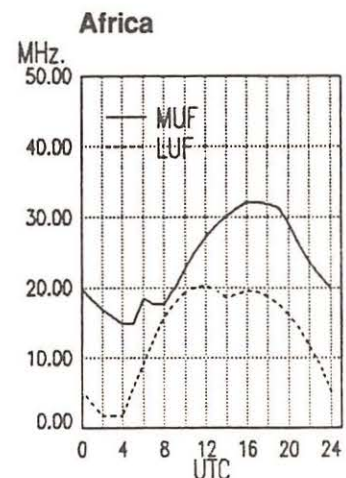
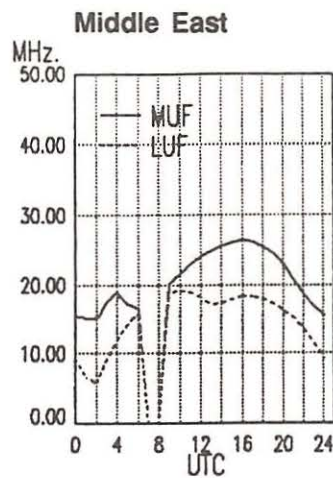
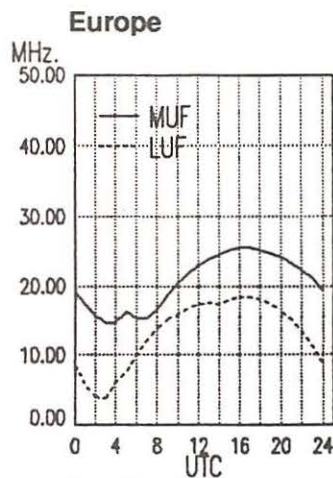
shortwave guide

How to use the propagation charts

Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location.

Then look for the one most closely describing the geographic location of the station you want to hear.

Conditions for areas EAST of the Mississippi and ...

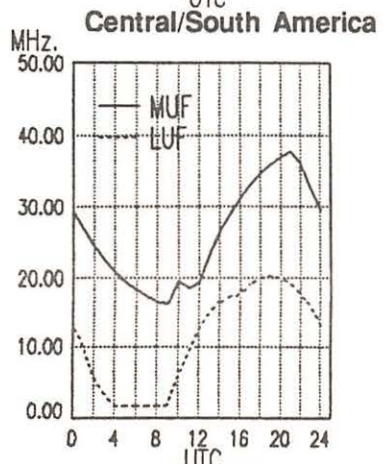
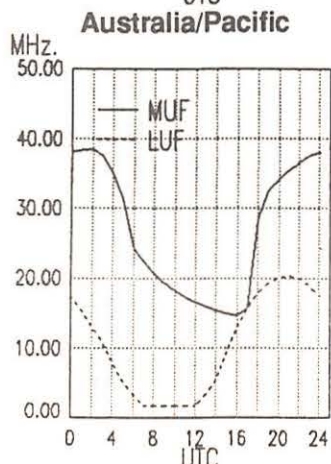
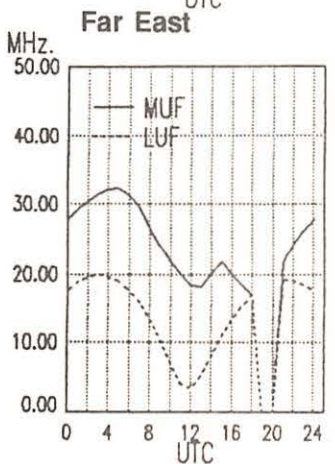
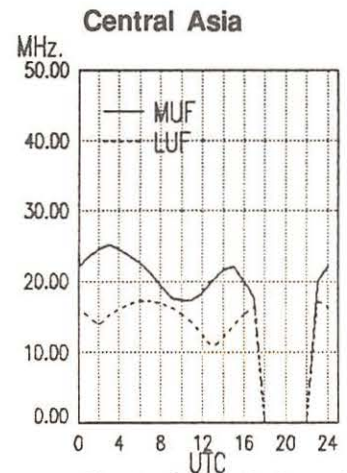
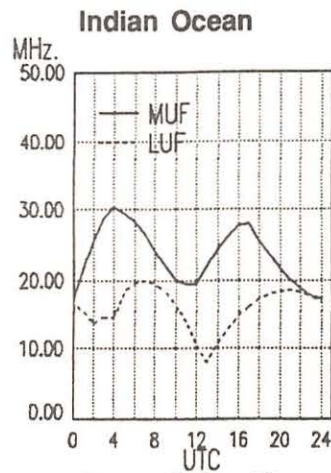
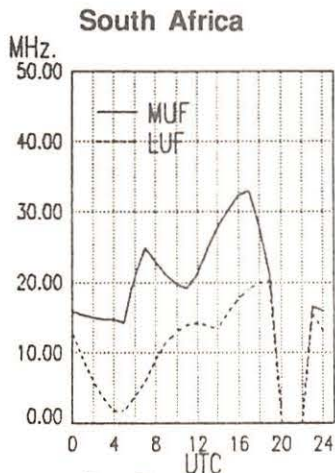
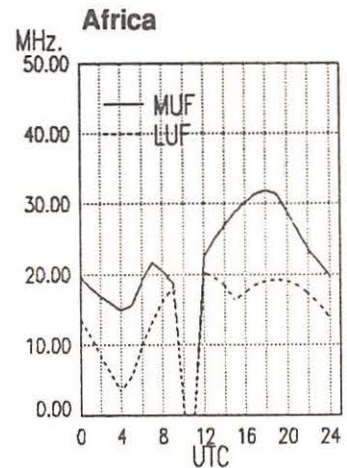
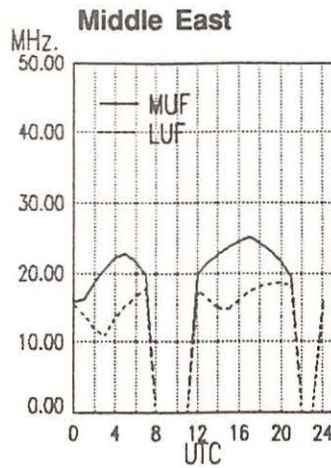
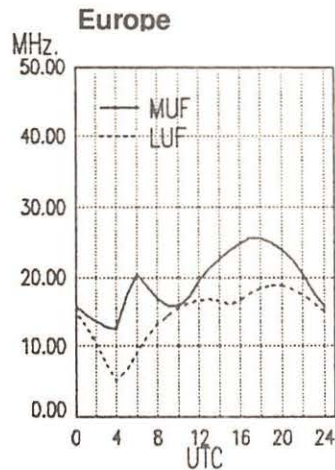


shortwave guide

Once you've located the correct charts, look along the horizontal axis of the graph for the time that you are listening. The top line of the graph shows the Maximum Usable Frequency (MUF) and the lower line the Lowest Usable Frequency (LUF) as indicated on the vertical axis of the graph. The strongest signals will be near the MUF.

While there are exceptions to every rule (especially those regarding shortwave listening), you should find the charts helpful in determining the best times to listen for particular regions of the world. Good Luck!

Conditions for areas WEST of the Mississippi and ...



Panasonic's Newest Winner



You probably already know the story. A dozen years ago, Panasonic helped kick off the rebirth of shortwave listening by making the hottest shortwave portables around. Time passed, and their shortwave design team was rewarded by being promoted to office automation research.

Unfortunately, the results of the replacement team were disappointing. Panasonic slipped from leader to also-ran, leaving the lion's share of the world band radio market to Sony and others.

In recent years, Panasonic has been stirring, issuing new radios -- notably the RF-B60 and its successor, the RF-B65 -- that made much more sense. Still, it wasn't quite like the old days. The 'B60 and 'B65 were commendable, if unexciting, but the lower-priced models left more than a bit to be desired.

Much Improved Model

Now, there is the rumbling of hooves at the Matsushita ranch. Its new Panasonic RF-B45, if it had run true to expectations, would have been simply the earlier RF-B40 with single-sideband reception hung on. Instead, Panasonic decided to go the whole hog and make the 'B45 a truly new model. It's quite an improvement, being more a variation on the top-of-the-line RF-B65 than a mere upgrade of the old 'B40.

The 'B45's tuning is fully synthesized, with digital frequency display. Tuning features include a keypad, nine memory presets (plus another nine for FM), and up/down slewing buttons like the buttons you use to carousel channels on TV. No tuning knob -- the set's biggest drawback -- but a function key allows you to scoot right to the desired shortwave band. There's also rudimentary frequency and memory scanning.

The keypad software uses memory presets as the default, with frequency and meter-band entries being done via first pressing the appropriate function key. No decimals are required for frequency entry.

The 'B40 tunes only in relatively coarse 5 kHz increments, but the 'B45 goes one better: it has a separate control to allow it to tune between 5 kHz points. This is not just a question of being able to tune more precisely. The revised tuning scheme also means the radio no longer needs an unusually wide bandwidth to tune off-channel stations "on the side."

Selectivity Wide, but Adequate

As with the Panasonic RF-B65, the 'B45's lone selectivity bandwidth is broader than it should be, but adequate. Here, Sony, whose better models usually incorporate tighter selectivity, continues to show a better understanding of the critical bandwidth requirements of shortwave.

The 'B45's sensitivity -- weak-signal reception -- is quite good. It's more than adequate for listening in Europe or North America east of the Pacific Time zone. (In the west and Hawaii, the highly sensitive and more costly Sangean ATS-808 makes more sense.)

More. The panel layout has been improved slightly, including having the zero key where it belongs: below the "8" in the three-by-three-over-one design. This follows the familiar pattern of telephone keypads, and is an improvement over Panasonic's past practice of placing the zero key under the "7".

The power switch lights up so you can see it at night -- better than an on/off "glow light" stuck somewhere on the front panel -- and the cabinet has been given a curvaceous "Eurostyle" facelift.

The liquid crystal display, alas, is not illuminated, but it does incorporate a 24-hour clock and a three-level signal-strength indicator. The clock appears only with the set off -- a genuine annoyance, but one that has the dubious characteristic of being widespread industry practice.

Novel Weak-Battery Indication

That display also has a battery indicator -- no surprise here. But how the set handles weak batteries is: the radio suddenly goes dead, but the clock continues to function and the battery indicator comes on.

This certainly lets you know when to replace the batteries. But it is a mite disconcerting to have your radio go into cardiac arrest right in the middle of a favorite program -- especially if replacement batteries aren't handy. Fortunately, a poke at the power button brings the radio back to life for a bit longer, allowing you to squeeze a few more ergs of energy out of enfeebled batteries...and catch the end of your show.

SSB Clunky, but Stable

If you're into listening to hams or utilities, there's also rudimentary single-sideband reception to gladden your heart. Its operation, similar to that Sony came up with years ago for the ICF-2002 -- and still in use today on the ICF-SW7600 -- is clunky, relying on a fine-tuning knurled thumbwheel alongside the set. There's no separate narrow bandwidth, either, nor an LSB/USB switch.

Making matters worse is that the thumbwheel doesn't alter the frequency readout. A received frequency of, say, 6152 kHz might read out on the display as 6150 or 6155 kHz, depending on where the set was tuned before you fiddled with the fine-tuning control.

Furthermore, the knob doesn't reset automatically to zero adjustment when you retune the receiver. This makes it easy to forget and leave the offset in place as you're tuning merrily up and down the bands. When this happens, you may find stations mysteriously appearing on "incorrect" frequencies. You get used to this after a while, but in general it's best just to leave that control off except when you really need it.

Still, it works, and for a compact portable it's quite adequate. It is less touchy to operate than the one Sony has used on its various compact

models, and the 'B45's SSB reception is surprisingly stable.

Well Suited to Travel Use

Traveling? The 'B45 has a "hold" key that maintains the set's status quo by making the other buttons inoperative. Turn the set off, poke that hold key, and the radio won't come on if the power button is pressed -- a real help in keeping the set from turning on accidentally when it's packed away in your suitcase.

When you can't rely on your hotel's morning wake-up call, there is a programmable "on" function, with "off" automatically occurring 90 minutes later -- no other shutoff cycle is selectable. For dozing, there's a sleep control that switches off the radio after 30, 60 or 90 minutes, as you prefer.

The AM band is tuned in either 9 or 10 kHz increments, which allows for AM reception in any part of the world. There's longwave coverage, too -- useful if you're traveling in certain other parts of the world, such as Europe.

FM is monaural only, with tuning in 50 kHz increments. This allows for FM reception in any part of the world, regardless of regional channel-spacing norms. Audio is, not surprisingly, far from ideal for FM, what with this set's modest speaker. The single hi-lo tone switch doesn't help, either. The audio's okay, nothing more, for shortwave.

Spit and Polish

There are the usual touches you expect from Panasonic and a shrinking handful of other high-quality manufacturers. Quality of construction appears to be above average throughout, unlike the cheapo Chinese wonders we've been seeing so much of lately.

The antenna base pulls up, and there's complete rotation and swiveling -- all of which allow you to use the set laid on its back, where it belongs. Further aiding this is a flip-out elevation panel to tilt the set up towards you.

The 'B45 comes with no AC power supply. Panasonic's RP-65 power supply, at \$6.95, is optional for use in North America and other places with 120V AC power. Better, if you travel abroad, is the RP-38 worldwide 120/220V AC power supply, \$14.95.

Thus Spake Matsushita

A word has to be said about the instruction manual. By now, we've all become used to poorly written Japanese manuals. The 'B45's is no exception, and in some ways is downright counterproductive. The illustrations are excellent, but in many cases the writing doesn't begin to explain things clearly or fully for the newcomer.

In yet other cases, technical minutiae -- E layers, F layers, and the like -- are laid out that arguably only serve to confuse the poor neophyte who is still trying to figure out what shortwave is all about.

Sometimes, the advice is downright misleading. Telling people, for example, that an external antenna is "necessary in mountainous regions" is balderdash, plain and simple. It's a thick multilingual thing, too -- just what the doctor ordered to scare people off who already think shortwave was invented by Martian technonerd.

That's the bad news. Good news is that Panasonic may be working on an improved manual. Let's hope so.

Bottom Line: Best in Price/Size Class

The 'B45's best news is its price: \$189.95, list, with street price certain to be markedly lower. This makes it a top contender for a high-quality "starter" model, as well as a second set for traveling or knocking about the yard.

Light, compact, well made, reasonably priced -- a generally good performer and sensible to operate -- Panasonic's RF-B45 is the best compact radio under \$200. Indeed, in the under-\$200 category, only the larger, pricier and more complicated Sangean ATS-803A and Realistic DX-440 perform better.

Panasonic, a distant player in the North American shortwave market, is all but certain to treat its attractive new portable as a near secret. Grundig, Sony, Radio Shack and some others have begun to beat the drums in the marketplace, but at Panasonic if it ain't mass market -- and for a giant like Matsushita a million units a year in North America, even if growing fast, isn't considered mass market -- it doesn't get serious promotion.

A pity, but that's Panasonic's problem. For us, there's finally a sensible, high-quality compact portable available for a modest outlay.



PASSPORT'S "RDI White Paper" equipment reports contain virtually everything found during IBS' exhaustive tests of premium receivers and antennas. These reports are available in the U.S. from Universal Shortwave, EEB and DX Radio Supply; in Canada from PIF, C.P. 232, L.d.R., Laval PQ H7N 4Z9; in Europe from Interbooks, 8 Abbot Street, Perth PH2 0EB, Scotland; in the U.K. from Lowe Electronics stores; and in Japan from IBS-Japan, 5-31-6 Tamanawa, Kamakura 247. For a complete list, send a self-addressed stamped envelope to RDI White Papers, Box 300M, Penn's Park PA 18943 USA.

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Need to know the subaudible tone of radio services in your area? Find out with the new

AIE Tone Finder

It has been more than a year since we introduced our readers to a unique product of interest to the scanning enthusiast (as well as the communications service shop), the Tone Finder from Automated Industrial Electronics.

The attraction of this reasonably-priced digital readout is that it prominently displays the subaudible tone, variously called continuous tone coded squelch system (CTCSS) or Private Line (Motorola's "PL"), which accompanies many VHF and UHF transmissions, especially on repeater systems.

The purpose of CTCSS is to discriminate among several co-channel users in a busy radio system, allowing participants to share the channel without having to listen to chatter from the other users. Similarly, a scanner with a CTCSS decoder permits the listener to select which users sharing particular channels he wishes to monitor.

Some (by no means all) trunking systems also use subaudible tones to group common users as they hand off from channel to channel. A scanner with CTCSS is a powerful tool in tracking this particular type of trunked radio system.

At the present time, the only scanner equipped with the CTCSS tone board option is the Uniden BC760XLT (and identical BC950XLT). Coupled with the AIE Tone Finder, the scanner is a powerful package. (See this month's Experimenter's Workshop for information on installing CTCSS capability on other scanners.)



Pick out the channel user you wish to hear with the TF-2 -- a perfect match for the BC760 XLT!

How does it work?

The attachment of the TF-2 Tone Finder has no effect whatsoever on the normal functions of the host scanner; it simply takes some current from the 760's husky power supply and sample audio from the detector.

Four solder connections are required to attach the TF-2 to the 760's circuitry; full instructions, including a schematic diagram of the accessory, are provided.

The TF-2 is actually installed in a Uniden BC760XLT cabinet so it matches perfectly with its saddled attachment. Four screws are included for the piggyback mount; no assembly of the accessory is required and the little unit snaps right in place after you remove the cover of your BC760XLT.

MT's Lab Test

Our sample TF-2 worked flawlessly on a BC760XLT provided by Grove Enterprises. The giant three-digit LED display is brilliant--no doubt what the numbers are!

The counter displays only whole-number frequencies; the decimal is dropped. For example, 151.4 Hz will show as 151 on the display. This poses no problem; a complete list of PL tones is provided in the instructions.

Sensitivity of the Tone Finder circuitry is excellent; if you can hear the signal at all and it is using CTCSS, the frequency of the tone will be solidly displayed.

To encode the scanner so that it will respond only to signals on that channel using CTCSS, simply enter that tone into the scanner's tone board via the keypad.

The Tone Finder is designed to respond only to low frequencies; its switched-capacitance, low pass filter has a sharp cutoff above 250 hertz, the upper frequency limit of subaudible tone encoders and the beginning of voice frequencies (typically 250-2500 Hz).

The TF-2 processes the extracted low frequency tone by feeding it to a 40 kHz multiplying frequency counter in order to register the actual tone frequency.

Component layout on the professionally-designed circuit board is extremely clean and compact. The board is the result of several generations of tone-measuring devices.

The TF-2 Tone Finder is \$189.95 plus \$4 shipping from AIE (P.O. Box 70, Batesburg, SC 29006). Directions are provided for installing it on your BC760XLT/950XLT; however, the TF-2 may be installed on any scanner for readout of the CTCSS tone frequency, even though the scanner has no tone board signal. To have the TF-2 installed by AIE, send your scanner to AIE along with an additional \$30 for labor. For further information, call 803-532-9256.

AVCOM Low Cost Spectrum Analyzer

Few instruments capture the imagination of the monitoring enthusiast like a spectrum analyzer. While a conventional receiver or scanner hears one signal at a time, the spectrum analyzer paints a visual panorama of all signals within a wide swath of spectrum simultaneously on the screen.

But traditionally, spectrum analyzers have been expensive, averaging \$8,000-\$30,000 each. Now AVCOM has introduced a series of low cost alternatives for under \$3000.

Looking through the AVCOM catalog, we decided to buy the model PSA-65A since it offered the most attractive list of functions and optional accessories for the consummate communicator as well as the service shop.

A look at the PSA-65A

Borrowing from raster-scanned television technology, the 65's 4-inch, green phosphor CRT display is crisp and fast, responding well to signals from 2 to 1000 MHz.

Span widths of 0.2 (optional), 1, 5, 10, 50 and 100 MHz per division permit total spectral display as wide as 1000 MHz and as narrow as required to see the sidebands of a single carrier. Virtually infinite resolution is provided by a variable span control.

Power for the unit is provided both by an internal 120 VAC supply as well as internal

nicad batteries which are recharged by the unit's AC supply.

Center frequency readout is displayed by a four-digit, unlighted, 1/2-inch LCD. One decimal place means that accuracy is limited to $\pm 100\text{kHz}$ or so, and extended update time means that there is about a one second delay before the newly-tuned frequency appears on the display.

Remember, this is a test instrument designed to simultaneously display all the signals on the air at any particular time over a wide swath of spectrum; it is not a frequency counter or communications receiver.

How about sensitivity? Stated by the manufacturer as -95 dBm (about 3 microvolts), this isn't as good as a scanner, but it does respond to most local signals. An external VHF/UHF preamplifier will increase system sensitivity considerably.

The audio demodulator, a \$185 option, allows FM to be heard through an internal speaker or fed through a front-panel mini headphone jack.

The filter bandwidth automatically tracks the span width and varies from 100 kHz to 3 MHz. Selectivity is adequate to separate the wideband broadcasters, but the strongest narrowband signals will dominate in the closely-spaced land mobile services.

No AM capability is available (although some AM detection can be heard through the speaker at low levels coming through the limiter).

Another option, the \$275 10 kHz resolution bandwidth, allows the lower frequency of the instrument to extend down to approximately 200 kHz.

Since only one intermediate frequency (IF) system is used, the operator must choose between spectrum display and audio recovery; simultaneous audio and display are not possible.


The bottom line

We find our Avcom pre-eminently suitable for the majority of applications where we need to see a swath of spectrum to find harmonics and oscillations, to tune coils and filters, to identify unknown signals, and to align preamplifiers and other radio frequency equipment.

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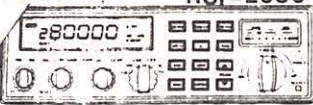
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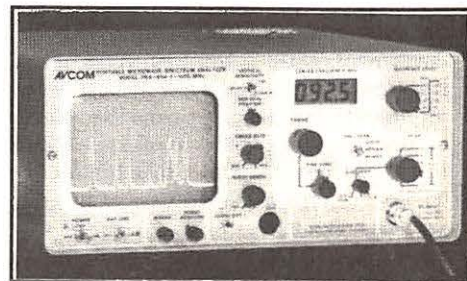
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The PSA-65A spectrum analyzer is \$2855 from AVCOM (500 Southlake Blvd., Richmond, VA 23236). Phone 804-794-2500 for additional information.



Antenna Matching for Shortwave Receivers

Weak-signal reception can be enhanced by matching your outdoor antenna to the input stage of your shortwave receiver. To get the maximum power or signal-energy transfer, unlike impedances must be matched.

This matching of impedances can be accomplished in a number of ways. The simplest approach is to use a tunable matching network between the receiver antenna terminals and the antenna. When a wide range of frequencies is being monitored, the matching network would consist of variable capacitance and variable inductance.

The impedance of a multi-frequency antenna changes with the operating frequency. Only a resistive dummy antenna exhibits the same impedance, no matter what the operating frequency. This article describes methods for coupling an outdoor antenna to your receiver for maximum signal transfer.

Antenna couplers in general

Antenna couplers are known by many names — transmatches, ATUs (antenna tuning unit) and antenna matchers. They all perform the same task. They match unlike impedances to obtain optimum antenna efficiency. Also, some couplers offer additional selectivity for the receiver, and this helps to prevent receiver overloading from strong signals that are nearby in frequency. A selective coupler can also reduce or eliminate unwanted spurious responses that are known as "images."

Various tuning networks are used by shortwave listeners and hams. Examples of these circuits are illustrated in Figure 1. Circuit A shows a simple "L" network. C1 is always used at the end of the network that connects to the highest of the two impedances. For example, if

you connect a 50-ohm receiver to a 300-ohm antenna impedance, C1 is at the 300-ohm end of the circuit.

Conversely, if your antenna or feeder impedance reflects a 20-ohm impedance, C1 is used at the receiver (50-ohm) end of the network. Therefore, if you use an L network with a variety of antennas, it will probably be necessary to reverse the coupler for some of the antennas.

Figure 1B shows a "T" network. This circuit and the L network at A are both low-pass types of devices. This means they reject frequencies above the one to which the antenna is tuned, but pass all frequencies that are lower than the one you are receiving. This means that some useful selectivity is being introduced ahead of your receiver.

The T network is capable of matching a wide range of impedances easily, whereas the L network does not have as much flexibility. You have an additional control to adjust (C2) when using a T-match network.

The most selective of the networks is illustrated at C of Figure 1. This parallel-tuned circuit has what is known as a "bandpass" response. This means that frequencies above and below the one of interest are attenuated. Excellent additional front-end selectivity is ensured with this circuit. Again, you have one more control to adjust than is the situation with an L network.

How to build a tuner

There is nothing difficult about constructing a tuner. You can assemble the circuit on a piece of wood or metal. L1 for each of the circuits in Figure 1 can be hand-wound on a piece of PVC tubing. Taps (the more the better) are placed on the L1 coil winding and these taps are selected by means of a multiposition rotary switch (phenolic or ceramic). If you don't want to use a switch, you may select the proper tap by using a short clip lead that is attached to the appropriate coil tap.

You may need to "shop around" for variable capacitors C1 and C2. Many surplus electronics vendors list them in their catalogs. Fair Radio Sales (1016 E. Eureka St., P.O. Box 1105, Lima, OH 45802 419/223-2196) sells many types of variable capacitors. Junked AM broadcast-band radios contain capacitors that are suitable for the circuits in Figure 1, especially tube types of radios. You can often find variable capacitors at radio flea markets.

The wires that connect the parts in your coupler should be kept as short and direct as practical. This is especially important for good

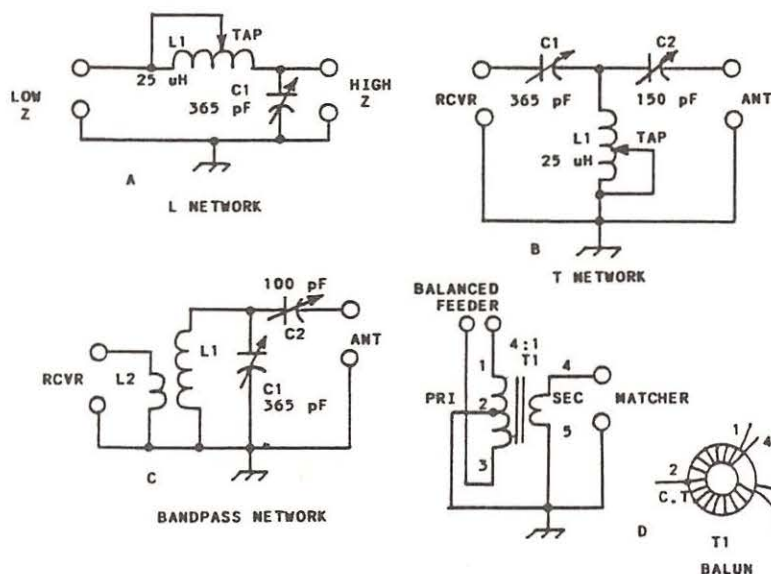


Figure 1 — Examples of LC matching networks. Circuit A may be reversed (see text) to accommodate various impedances. Z = impedance in ohms. Circuit B has greater matching range than circuit A. The L and T networks have a low-pass response. The tuner at C has a bandpass response and will match a wide range of impedances. C1 and C2 at B, and C2 at C must be insulated from ground. To avoid hand-capacitance effects when adjusting these capacitors, use an insulated tuning shaft, such as a piece of wooden dowel rod. A conventional type of broadband balun transformer is shown at D. It is used between balanced feeders (see text) and the coupler. T1 has 16 turns of no. 26 enamel wire on an Amidon Assoc. FT-50-61 ferrite toroid. The secondary has 8 turns of no. 26 enamel wire. Place the primary tap at 8 turns. L1 in all of the circuits has 100 turns, close wound, of no. 26 enamel wire on a 3 1/2 inch piece of 1/2 inch PVC tubing (5/8 inch OD). Tap this coil at 10-turn intervals. L2 at C has 10 close-wound turns of no. 26 enamel wire over the grounded end of L1.

operation at the upper HF (shortwave) frequencies. Long leads introduce unwanted inductances which can spoil the coupler's ability to match unlike impedances at frequencies above, say, 15 MHz.

How to adjust your coupler

Radio amateurs adjust their couplers by applying transmitter output power to the antenna system and adjusting the coupler for a 1:1 standing-wave ratio (SWR). A shortwave listener must use a different technique. A noise bridge may be used to adjust the coupler for a match to 50 ohms.

If you do not wish to buy a noise bridge, you can adjust the system by ear or while observing the S meter of your receiver. Adjust the coupler controls and coil taps for maximum signal strength while listening to a weak signal on or near the frequency of interest. Although this is not a precise method of adjustment, it is adequate for our needs.

There is always some interaction between the coupler controls. You will need to readjust each of them two or more times to find the best settings for maximum signal reception. Log the settings of the controls for your favorite shortwave frequencies. This will enable you to readjust the coupler quickly when changing frequency.

The couplers in Figure 1 may be used with end-fed wires or antennas that are fed with coaxial cable. If you want to use the tuner with balanced feeders, such as open-wire line or 300-ohm TV ribbon, simply install a 4:1 balun transformer between the output of the coupler and the balanced feed line. Details for building your own balun are provided in *The ARRL Handbook* and *The ARRL Electronics Data Book*. Figure 1D shows how to make a small toroidal transformer that will serve as a balun for the couplers in Figure 1.

Receivers that lack antenna terminals

There are numerous multiband receivers that have only a whip antenna or built-in ferrite loop antenna. It is difficult to attach an outdoor antenna to these receivers. Figure 2 shows how to connect an exterior antenna to the loops in AM radios and to the whip antennas of HF receivers. For AM broadcast-band radios, simply wrap a one- or two-turn link of no. 26 enamel wire over the grounded end of the loop rod, as shown. This link may then be connected directly to a wire antenna, or it can be routed to an antenna coupler (preferred to minimize image responses).

Figure 2B demonstrates how to couple your antenna to a radio that has a whip antenna. The whip or rod is telescoped to a height of roughly one inch. The top of the collapsed whip is

connected to the receiver chassis ground by means of a short wire or clip lead, after the toroidal coupling transformer is slipped over the whip.

The whip antenna then acts as a one-turn link for the transformer. The toroid winding functions as the transformer primary. Signal energy is thus introduced to the front end of the radio.

I have used this technique successfully with a number of low-cost imported shortwave portables. I prefer to connect the T1 primary winding to an antenna coupler when I use this method.

In summary

The suggestions I have offered in this article should make your shortwave listening more effective and enjoyable. The additional fuss that goes with adjusting an antenna coupler is well worth the effort. You will have fun constructing a piece of equipment that will enhance your ability to receive weak signals while minimizing the effects of strong signals above and below your frequency of interest.



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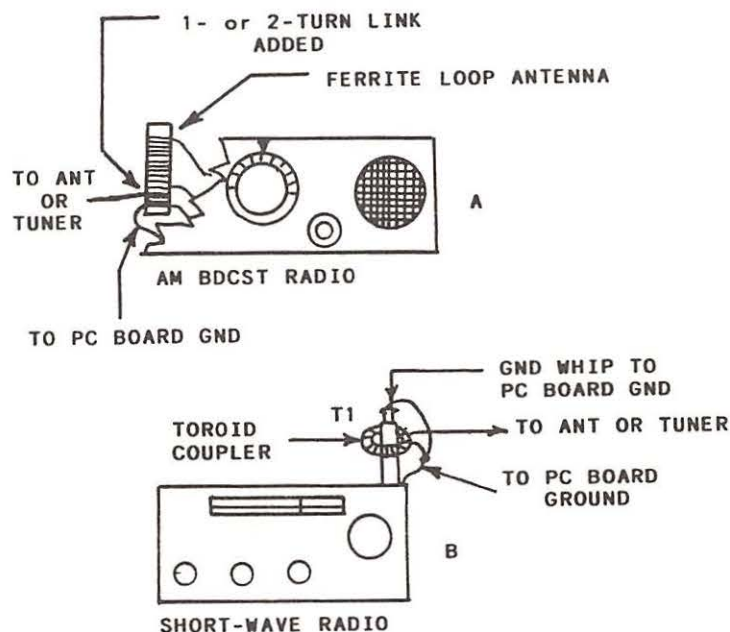


Figure 2 — An external antenna may be connected to an AM radio by adding a one- or two-turn link at the grounded end of the radio's built-in loop antenna, as shown at A. A toroid (T1) can be slipped over a collapsed whip antenna to permit using an external antenna for shortwave reception, as shown at B. T1 has 10 turns of no. 26 enamel wire on an Amidon Assoc. FT-50-61 ferrite toroid (permeability is 125 and core OD is 1/2 inch). One end of the toroid winding and the top of the whip must be grounded to the PC board ground bus.

An Introduction to CTCSS

Continuous Tone Coded Squelch System (CTCSS) is the generic name of a useful feature in modern communications systems. CTCSS is also known under the Motorola trademark, "PL" and perhaps a few other buzz terms.

CTCSS has two purposes in communications systems, one of which is to activate distant repeaters and the other to "squellch out" all signals except those which are directed to a specific receiver or system of receivers. A CTCSS function can be very useful in the hobby monitoring post.

An example might explain it best: Suppose you avidly monitor private detectives on your scanner. You'll know then that more than one company or agency is assigned to a given frequency. This means that your scanner will be alive with signals much of the time.

But what about the times when you'd prefer to monitor only one detective company out of the dozen or so that could be assigned to that frequency? CTCSS provides that capability.

Here's how CTCSS works: Many if not most VHF/UHF transmitters send out a continuous tone along with any voice or data signals. The tone is very precise and is recognized by an electronic circuit installed in the receiver (scanner).

If a CTCSS Tone Decoder is programmed to recognize that tone, then it will unsquelch the receiver and allow signals to pass whenever that particular tone is received. If other tones or none at all are present, then the receiver stays squelched and you won't hear anything!

This is the heart of the concept whereby several agencies, companies or individuals can share the same frequency and yet not be distracted by each other's communications.

Some 40 CTCSS tones are in general use, 32 of which are standardized by the Electronic Industries Association (EIA) as shown in Table 1.

A CTCSS tone decoder can easily be added to your PRO-2004/5/6 and most any other scanner! A simplistic installation will involve no wire cutting and no serious hacking and chopping into your scanner. Connection of only four wires are necessary: ground, plus dc power, and one wire each to the volume and squelch controls!

It would be extremely difficult to fabricate your own CTCSS tone decoder, but thanks to modern technology on a chip, inexpensive, easily installed modules and other CTCSS equipment are available.

Table 1

EIA Standard Subaudible CTCSS Tones

Tone No.	Tone Code	Tone Freq (Hz)
1	XZ	67.8
2	XA	71.9
3	WA	74.4
4	XB	77.0
5	SP	79.7
6	YZ	82.5
7	YA	85.4
8	YB	88.5
9	ZZ	91.5
10	ZA	94.8
11	ZB	97.4
12	1Z	100.0
13	1A	103.5
14	1B	107.2
15	2Z	110.9
16	2A	114.8
17	2B	118.8
18	3Z	123.0
19	3A	127.3
20	3B	131.8
21	4Z	136.5
22	4A	141.2
23	4B	146.2
24	5Z	151.4
25	5A	156.7
26	5B	162.2
27	6Z	167.9
28	6A	173.8
29	6B	179.9
30	7Z	186.2
31	7A	192.8
32	M1	203.5

The following companies can provide more information on how you can add CTCSS capability to your scanner or other communications equipment. If you'd like to see more on CTCSS in future issues, please let me know.

CTCSS Tone Decoders:

Communications Specialists, Inc.
426 West Taft Avenue
Orange, CA 92665-4296
800-854-0547; 714-998-3021

Selectone
23278 Bernhardt St
Hayward, CA 94545
800-227-0376; 415-887-1950

Other CTCSS Equipment & Hardware:

Mil-Spec Communications Co.
P.O. Box 461
Wakefield, RI 02880
401-783-7106

Automated Industrial Electronics
141 Granite St
Batesburg, SC 29006
803-532-9256

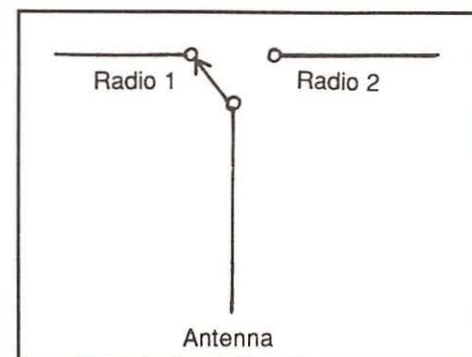
Mobile Radio Resources
2661 Carol Drive
San Jose, CA 95125
408-292-4342

An Antenna Switch for Receiver or Transceiver

Ronald Hester of North Carolina recently sent a reprint of an article that ran in the August 1986 issue of *QST* magazine. It features a home-made antenna switch for selecting either of two antennas into one receiver or transceiver. Conversely, it could be used to switch one antenna between two radios.

Its heavy-duty contacts permit it to handle up to several hundred watts of power at frequencies under 30 MHz, but its open wiring technique and lossy dielectric (insulation) don't make it as applicable to serious VHF/UHF monitoring.

The parts are readily available: a two-way light switch, a metal switch housing and cover plate, and three SO-239 chassis-mount UHF



Simple SPDT switch configuration

connectors which fit in the punch-out holes on the box.

The flanged variety connector with four mounting holes is preferred -- if you don't mind drilling the extra holes -- since it is less likely to come loose with repeated removals of the mating PL-259 cable connectors than is the CH-239 bulkhead connector.

Use solid, insulated, residential house wire, and be sure to test the switch screw terminals with an ohmmeter before attaching the wires to be sure that the wiring is properly routed to the connectors.

Where Can I Find ...

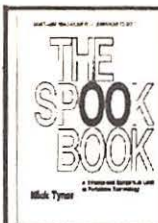
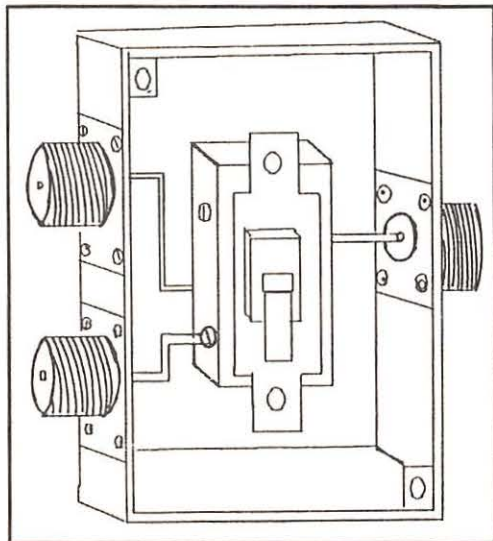
E.C. Woodworth of New York sends us a source for 455 kHz ceramic resonators (used in the Sept '90 Hallicrafter S-120 mods). He says Ocean State Electronics (P.O. Box 1458, Westerly, RI 02891) lists 26 resonators from 200 kHz to 15.0 MHz. 455 kHz is part #38/26455, at 64 cents; minimum order \$5.

Another item that had been asked for was a source of Sony 2010 service manuals. P.S. de Beaumont of Massachusetts received one in a couple of weeks from the Sony Service Center (386 Route 17 South, Mahwah, NJ 07430; 201-529-1655, 1656). There may be other centers closer to your region, but he had no trouble placing his order over the phone on a charge card (\$9 plus \$3 shipping plus sales tax!)

That winds up this month's Workshop; if you have an experience or modification for any type of radio equipment that you think would be helpful to other readers, jot it down. If it makes it into print, there may even be a small reward in it for you!

Likewise, let us know what problems or mods you'd like us to address. All correspondence goes to your Experimenters Workshop editor, Bill Cheek, P.O. Box 98, Brasstown, NC 28902; If you're looking for a reply, you must enclose an SASE.

73/bc



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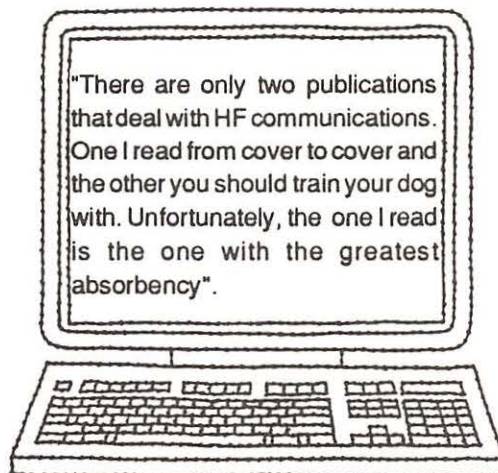
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Seen recently on a computer billboard:



Toggle wall switch mounted in enclosure, cover removed, showing SO-239 connectors installed in punch-outs.

Make Friends with an Old Friend: The Dipole Antenna

A perennial favorite among shortwave listeners, amateur radio operators, government agency radio sections, and just about everyone connected with serious radio communication is the venerable halfwave dipole antenna. This work horse of the radio world was the first antenna ever to be devised to radiate electromagnetic waves, and I would guess that it is still the most commonly utilized type of antenna in radio work.

A Winning Combination:

There is good reason for this antenna design's popularity. It offers the hard-to-beat combination of low cost, ease of construction, low maintenance requirements, and good gain. It is not a high gain antenna, but is so well known and highly utilized that it has become the antenna against which other antennas are compared in technical reports of antenna performance. When you see an antenna rated in terms of dB, this means gain in decibels compared to a dipole.

The Dipole as a Noise Reduction Antenna:

Although the halfwave dipole's radiation and reception pattern has two nulls (areas of signal rejection), they are very sharp. This means that, in a practical sense, the antenna is close to being nondirectional. But these nulls can be put to use: if you have noise you want to "null out," mount the antenna at right angles to a line from the center of the antenna to the

noise source. However, the nulls are sharp, and you may have to adjust the antenna's position to get the null squarely aimed at the noise.

The Dipole as a Multiband Antenna:

The halfwave dipole is cut to function optimally for a band of your choice. On the other hand, dipoles will usually give fair reception on other bands higher in frequency than the one for which they were designed. In particular, they perform quite well, although with different orientation of the nulls, on the band which is three times the frequency for which they were designed -- the third harmonic of the fundamental band.

So, if you want an all-around antenna which will give really good performance on your favorite band, with operation on other bands as a bonus, why not try your hand at this antenna which has given so much communication pleasure to so many people over the years?

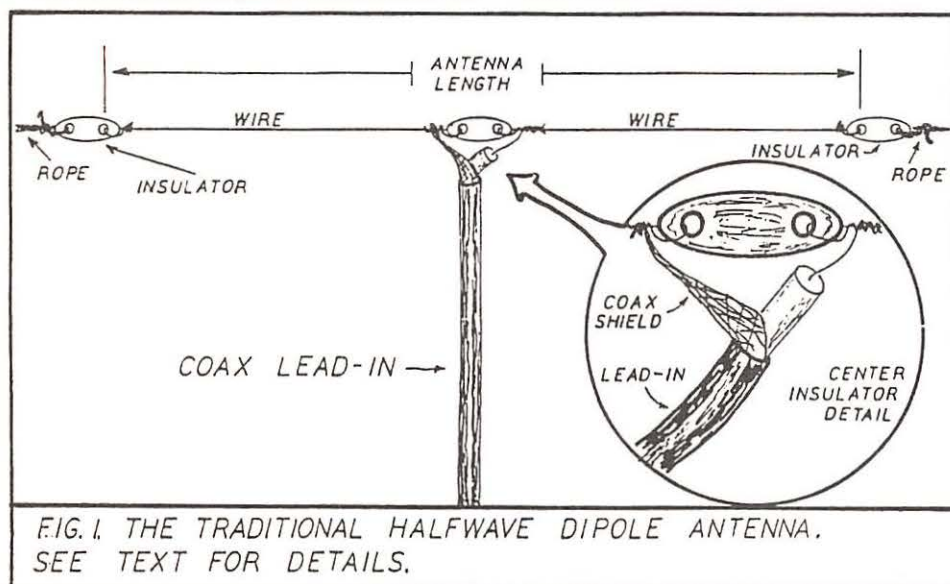
Let's Build One:

First decide the band for which you wish to design the antenna. If you have two favorite bands, one of which is three times the frequency of the other, design the antenna for the lower frequency of the two. As suggested above, this will give you good performance on both these bands. One common instance of this is the use of a dipole cut for the 7 MHz amateur band on the 21 MHz band as well

To determine the antenna's total length, in feet, use the formula $L = 468/\text{frequency in MHz}$.

For example, a 3 MHz dipole would be $L = 468/3 = 156$ feet in length. And this antenna would function optimally on both 3 MHz and the third harmonic of 3 MHz which is 9 MHz. The 156 feet is the length between the two extreme ends of the antenna.

1. Choose the band you will use and get enough wire for the antenna's length. Add about a foot to this length to allow for the length used in wrapping the wire around the insulators as instructed below. You'll also need a coax lead-in cable (any good coax will work fine) with a plug for your receiver's antenna input, and guy ropes.
2. Cut the wire to length as determined by the above formula. Don't forget to add a few inches for putting the wire through your insulators and twisting the end in place as in the inset of Figure 1.
3. Put an insulator on each end of the length of wire determined in step 1. See the inset in Figure 1.)
4. Cut the length of wire at its exact middle and install these two center "ends" of the wire on the insulator which you will use as the antenna's center insulator. Scrape the wire bright at both ends of the insulator where it wraps around itself and, if possible, solder it in place. You will attach the lead-in cable to these soldered connections.
5. Now prepare your lead-in. Connect the center conductor of the coax to one soldered connection of step 4 above, and then connect shield or braid of the coax to the other soldered connection. Solder both these wires in place if possible. Cover the connections and coax ends with coax-type sealer to keep out the weather.
6. Run the lead-in to the receiver and add your choice of protection against lightning-induced damage. The minimum here is to never operate the antenna in stormy weather, and disconnect and ground the antenna when it is not in use.
7. To maximize your chances of getting good listening results, it's best to time





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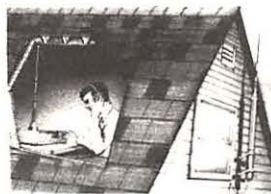
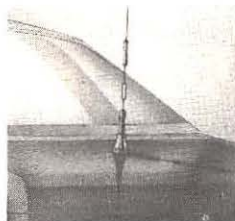
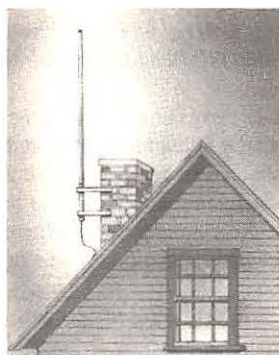
Manufacturers of multi-band Land Mobile, Microwave, and Scanner Antennas for Government Agency operations, Drug and Law Enforcement operations, Communications at the Kennedy Space Center and major networks such as NBC and ESPN.



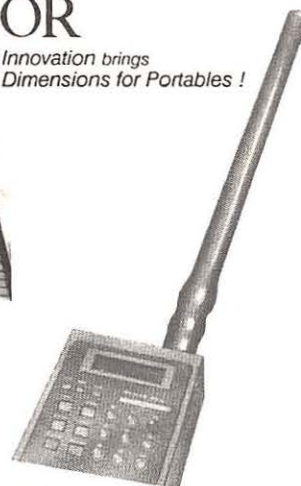
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your listening for the time of best signal propagation on the band you are listening to. You will more likely hear signals on the longer shortwaves, (say 3 MHz up to 7-10 or so MHz) in the late evening and nighttime hours, and on the shorter short waves (say 10-15 MHz or so up to 30 MHz) during the sunlight hours.

Tornadoes to Tugboats:

I've had a number of requests for the Tornado Alley Special weather station antenna plans, which are still available for an SASE. Be sure to keep me informed as to the kinds of antennas (bands, applications) you need with your monitoring and I'll try to come up with appropriate antenna designs in this column.

RADIO RIDDLES

Last Month:

We had the riddle: There once was a dentist named Loomis, whose name may not mean too much to us. But in days long gone by, he flew a kite in the sky, and gave the word "antenna" to us.

Then I asked you what is Loomis's given name, and why is he cited in many serious historical works on the history of radio? Well, Mahlon Loomis was a dentist who came up with a remarkable wireless communications system in which he conceived of the atmosphere as one electrode of a giant battery with the earth as the other electrode. He flew a kite into the atmosphere from a mountain top, using an electrical conductor for the kite string. He connected an electrical meter from the kite string to the earth.

On another mountain a similar kite was being flown with an electrical switch in place of the electrical meter. When the switch was closed on the one mountain, the meter would indicate current flow on the other mountain.

Most radio historians feel that Loomis's system did not utilize radio waves, but functioned via conduction caused by ionization of the atmosphere, in which the complete circuit included the first kite string, the atmosphere, the second kite string, and the earth as a return path.

Where did the word antenna come in? That's what Loomis called his kite strings.

This Month:

Today more people than ever before are enjoying radio as a hobby and as a means of communication for both business and pleasure. Where did radio technology come from? Who first found that we could send waves of electrical energy (radio waves) without wires (wireless communication)? The answer may not be exactly what you find in your history book.

Find an answer to this month's riddle, and much more in next month's *Monitoring Times*. Till then, Peace, DX and 73.



What if my MT is late?

If your copy of *MT* doesn't show up on your doorstep, give it until the 10th of the month, and then call us. We can replace up to two issues per year, but give the Post Office a chance!

Q I have a real antenna problem for shortwave reception. I work on the third floor, in the center of the building (no windows) and have no FM reception on my radio. I've tried moving the radio around the room with no improvement and nearby computers wipe out anything I try. What can I do? (Richard Martinez, Phoenix, AZ)

A Your only hope is to get an antenna out free and clear of all shielding, electrical wiring interference, computer noise, etc. Can you get into a false (drop) ceiling? The higher the better--how about a small coax up through wall space (or outside the windows) to the roof or back inside an attic crawl space?

The simplest FM antenna is a folded dipole, nothing more than a four-foot length of inexpensive TV twin-lead tacked horizontally against the roof joists. The wires at each end should be twisted together and coax should be attached at a break in one side at the two-foot (mid) point, shield to one wire and center conductor to the other.

If there's room, you could even erect a commercial FM antenna made specifically for this purpose. The secret is getting that antenna high, free and clear of encumbrances.

Q Why don't scanners include signal-strength indicators for assisting antenna adjustment and other purposes like shortwave receivers? (Huson Wilken, Owego, NY)

A Scanners have never been considered communications receivers; they are specialized consumer radios like pocket portables and automobile receivers. When I was a consultant to the Electra Company (old Bearcat manufacturer), I tried for years to convince them that scanners should have S meters. My pleas fell on deaf ears.

Q I have been given several whip antennas with BNC bases, some rubber duckies, some with loading coils. How can I determine their operating frequencies? (Patrick Rick, Laguna Hills, CA)

A Metal telescoping whips are a cinch--divide 2802 by their length in inches to get their center operating frequency in megahertz. Loaded and helically-wound duckies are quite another matter!

To do the job right you would need to mount the antenna vertically on a large metal surface (ground plane) and attach a two-turn, one-inch loop from the base to the ground plane right at the feed point. Then, using a dip meter, sweep the meter through its ranges looking for a prominent dip.

Another possibility would be to take the antenna and attach it to a spectrum analyzer. Using a calibrated whip of known frequency (length), compare average signal levels throughout the spectrum. Those that match closely or seem to "peak" indicate the intended frequency.

Q I own a Realistic DX440 portable shortwave radio and a

PRO2006 scanner. I live on the ground floor of a two-story house with aluminum siding. I'm surrounded by high hills and buildings. There is a large computer complex next door and electric power lines running by. A TV station is one block away and I'm right below the flight path of the local airport. What can I do for better reception? (Frederick Dodge, Albany, NY)

A Move. I've never heard of such a concentration of adversity to listening! Your only hope is to get a decent antenna as high above the roof as possible, and even there it is likely that you will also improve your interference reception!

Have you considered model trains or stamp collecting?

Q What standards--and who sets them--dictate whether an FM signal is "wide band" or "narrow band"? (Huson Wilken, Owego, NY)

A In the United States, the Federal Communications Commission (FCC), under Part 2.202 of the Rules and Regulations, establishes standards for emission types. Narrowband FM has 16 kilohertz deviation above and below the center carrier; wideband is typically +/- 180 kHz, while the military utilizes a "medium band" deviation of approximately +/- 30 kHz (as do most VHF earth satellites).

Q Having recently been arrested for possession of a radar detector, I'm wondering if it is possible to shield the device so that it can't be detected by police? Are manufacturers considering such improvements? Are there any radar detectors which use different frequencies that the "detector detectors" can't hear? (TS, Suffolk, VA)

A No. Probably, but they'll be expensive. No.

Bob's Tip of the Month:

CTCSS Update

We recently passed on to our readers a suggestion for tracking trunked transmissions as they channel-hopped, suggesting that the BC760XLT with the optional CTCSS tone board installed would do the job. Score us 50% on that one.

For those trunked systems that use CTCSS (PL) tones, the idea works, but Motorola is not one of them -- they use digital bursts. Find out if your agency's system uses PL tones before committing to the tone board approach.

Miniaturize your Frequency List

Dave Christner of Cortland, Ohio, has found that by typing his favorite scanner frequencies on a sheet, then reducing them to 65%--twice-- on a photocopy machine, he has a handy look-up reference he can easily carry with his hand-held scanner. Protection is provided by encapsulating them in self-stick laminating sheets available from office supply stores.. Dave wishes that scanner manufacturers would put accessory pockets on carrying cases for these lists; it would be a handy place to keep the earphone and optional telescoping whip, too!.

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Questions or tips sent to "Ask Bob," c/o MT, are printed in this column as space permits. If you desire a prompt, personal reply, mail your question along with a self-addressed, stamped envelope (no telephone calls, please) in care of MT.

Q I have seen several advertisements for a walkie talkie whose channels are color-coded. What frequencies are these? (Gary Laurenzi, Bedford, OH)

A Color dots used to identify channels in the low power and itinerant services are as follows (all frequencies in MHz): red (151.625), blue (154.570), green (154.600), brown (464.500) and yellow (464.550). These radios all require FCC licensing to be used legally.

Q I have an old scanner that needs repair. The factory tells me they no longer have parts. Is there anyone out there who can fix it? (Numerous readers)

A Yes. Gerry Oliver of G&G Communications salvages literally thousands of scanners and pagers for parts and can do the repairs at reasonable cost. Write to him at 9247 Glenwood Drive, Leroy, NY 14482 or phone him at 716-768-8151 to see how he can help you.

Q I have several frequency lists with varying degrees of agreement. How can I find the real frequencies for licensees which I'm interested in monitoring? (Huson A. Wilken, Owego, NY)

A The Federal Communications Commission (FCC), of course, manages all civilian licensing. Their records are public information and many field offices have reading rooms for examination of licensing information.

A convenient source of scanner frequencies is Gene Hughes' *Police Call Radio Guide*, available from Grove Enterprises and Radio Shack dealers. A handy allocation table in the back of the directory provides excellent details on frequency assignments.

Q When an antenna picks up a signal out of the air it captures some of that energy. How many scanners would it take to remove all of the electromagnetic signal from just one transmitting antenna? (Dale Wagner, Margate City, NJ)

A Interesting question! Think about it for a moment. Let's (incorrectly) assume that 100% of the electromagnetic energy intercepted by the antenna is removed as signal voltage. At 155 MHz a half-wave dipole is 36" long; let's arbitrarily say it's 1/8" in diameter. That's 4-1/2 square inches.

The farther you are from the transmitting antenna, the larger the sphere (or donut) shape of energy is which has been radiated. Merely one mile away, the sphere has a surface area of over 300 million square inches and would require nearly 70 million scanner antennas, all perfectly in place, to form a shell which would capture all the energy!



A comprehensive list of questions and answers regarding monitoring may be found in Bob Grove's "Scanner and Shortwave Answerbook," \$12.95 plus \$3 shipping from Grove Enterprises, P.O. Box 98, Brasstown, NC 28902.

LETTERS

continued from page 3

Inquiry pointless.

• The Experimental Radio Service utilizes amateur radio equipment on non-amateur frequencies which surround the public safety allocations.

"*That's my bird* you have pictured on page 12 of your June 1991 issue," exclaims Robert Colegrove of Maryland. Bob saw the "Inside Looking Glass" photo of the EC-135 number 8048 and it brought back strong memories; He was assistant ground crew chief on 8048 twenty-five years ago. Bob tells the 8048's story from his perspective:

"While it is not at all unusual for 'old salts' to encounter their ships many years after they served in them, it's not often that old airmen ever come across our airplanes again. There are simply more planes than ships, and they are identified by impersonal numbers rather than names.

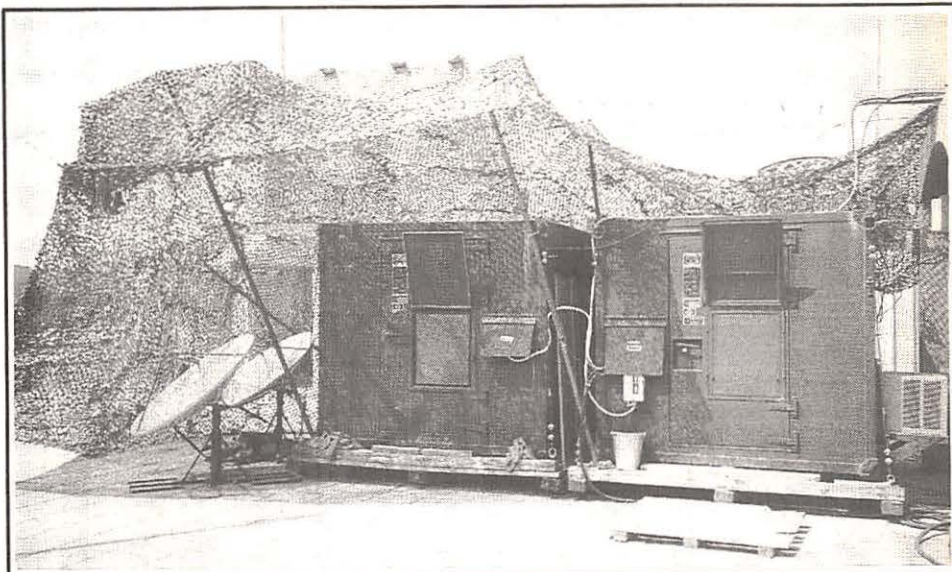
"Every SAC airplane was known by the last three digits of its serial number. Mine was 'zero-four-eight.' The complete serial number of the EC-135 shown in Bill Battles article is 63-8048. The first two digits indicate the year it was contracted or built.

"I was stationed at Westover Air Force Base, Massachusetts. I think we took delivery of 048 along with her sisters, 047 and 049 sometime in 1965. These were among the last production models of the KC-135A/EC-135C series which ended in 1964.

"We didn't have all the extra antennae that Bill describes in his article. Although the interior generally resembled the layout shown, the electronics were state-of-the-art for the mid '60's. We had a large rack of equipment equivalent to about three refrigerators in the forward section which I understood to be some sort of computer. Today you can probably fit the equivalent function into a cigar box.

"One item of interest to SWL's was the ARC/58 radio which had a set of controls over the co-pilots head. This was the standard HF radio on all tankers and was the first 'digital' radio I had ever seen. Frequency readout was odometer style and you set each digit with a separate knob. Tuning was done remotely from the control panel. The actual electronics were aft of the copilot. It took several seconds for the receiver to 'channelize' after you set the switches.

"Zero-four-eight was a good airplane. We never had much of a problem with it. It still looks good in Bill's photo, and I would have enjoyed seeing it again during open house. It's hard to



Desert radio and TV station near Riyadh, Saudi Arabia

imagine there are probably several airmen who fly on her or fix her who weren't even born when she was mine."

Ronald Texter of Michigan sent us an answer to Jeff Jacobsen's request for monitoring railroad ETDs (end of train device). An avid railfan himself, Ron offers this information: "The Association of American Railroads (AAR) has allocated one rail frequency that most of the large roads have decided to use - 457.9375 MHz."

This frequency is used by the following railroads: Union Pacific, Atchison Topeka & Santa Fe, Consolidated Rail (Conrail), Denver Rio Grande & Western, CSX Transportation, Southern Pacific, and Grand Trunk Western. Ron confirms Norfolk Southern as the only exception, using 161.115. Thanks Ron, on behalf of all the novice train buffs out there.

The BBC as a subversive?! Yes, radio can infiltrate locations where TV may have little hope of exposure, concludes an article from a British magazine, *The Economist*. Steven Goldman of Illinois, who provided the article on the BBC's plans to put the World Service on television, comments, "BBC radio is respected and 'subversive' in the sense that it reaches places where the local government may prefer its citizens not to listen -- sort of a shortwave Radio Free World. A television system that requires receiving dishes and more costly receivers would not reach as great, or news-needy an audience.

"It would be worrisome if the seeming attractiveness of something 'advanced,' like world TV would drain resources from radio. Let's hope that the authority and global scope of the BBC World Service radio remains the prime and authoritative source of English-language news."

No need to worry. World news networks the likes of Cable News Network, or the proposed Global News Network, or even the BBC's World Service Television, will never have the influence of that smuggled transistor radio. After all, as every U.S. neighborhood has discovered, there's just no way to disguise a satellite dish.

Speaking of struggling societies, here's a plea for help from the Lithuanian DXers Club. Covering short-, medium- and longwave broadcasting, this nineteen-member club publishes a newsletter, *Banga*, and has had a difficult existence since it was founded in 1988. Club chairman Sigita Zilionis says "DX clubs get IRCs for their publications, and then sell them to the post office against stamps which they need to cover their postage expenses. It would be nice if you could find DX club(s) which would agree to sell IRCs to us instead of to a post office, at the same or slightly higher price. We could transfer the money from our postal giro account in Berlin, and they would send the corresponding amount of IRCs."

Any individuals or groups interested in helping LDXC, or interested in seeing their DX service catalog (which includes such interesting items for sale as recordings of Radio Vilnius broadcasts in Esperanto, or the first regular broadcast of clandestine radio station "Tarybu Lietuva") may send one IRC to Lithuanian DX Club, A.D. 1646, 232010 Vilnius, Lithuania. Thanks to Leonard Jasiunas of California for forwarding the information.

Thanks to all our contributors this month; we'll see you in 30 with more good monitoring times!

- Rachel Baughn,
Editor

CONVENTION CALENDAR

Date	Location	Club/Contact Person
July 6	Oak Creek, WI	So Milwaukee ARC/ Robert Kastelic, PO Box 102, So Milwaukee, WI 53172-0102 Location: American Legion Post #434, 9327 S. Shepard Ave, Oak Creek, WI 53154, 7am-2pm, \$4 admission, talk in 146.580 simplex
Jul 12-13	Maplewood, MN	Amateur Fair/ Keith Mobarry, PO Box 26331, St. Paul, MN 55126 (612)653-9999. Location: Aldrich Arena, 1850 White Bear Ave, Maplewood, MN, Fri 6pm-10pm, Sat 6am-2:30pm, \$5 admission.
Jul 13-14	Woodland Pk, CO	Mountain ARC Swapfest/ CO Assoc of DXers* Location: Red Rocks Campground, 8am-4pm both days.
July 14	Downers Grove, IL	Dupage ARC/ Edwin Weinstein, WD9AYR, 7511 Walnut Ave, Woodridge, IL 60517
July 20	Wellington, OH	Northern Ohio ARS, Darlene Ohman, KA8VTS, 4122 Bush Ave, Cleveland, OH 44109
July 20	Union, ME	Maine Hamfest Assoc/ Rod Scribner, KA1RFD, 19 South Grove St, Augusta, ME 04330, (207)622-9197. Location: Union Fairgrounds, Route 17, 8am-2pm, \$3 admission.
July 20	So Burlington, VT	Northern Vermont Mid-Summer Hamfest Committee/ Joseph A. Tynecki, M1DMP, 71-3 Milton Falls Ct., Milton, VT 05468, (802)893-6458 Location: South Burlington Middle School, Dorset Street, 8am-3pm, \$3 admission, Talk-in on 145.47 or 146.85 +/- 600
July 21	Golden, CO	Denver Radio Club Hamfest/ CO Assoc of DXers* Location: Jefferson City Fairgrounds, 8am to ??
July 21	Berwyn, IL	Amat Cross Link Rptr Assoc/ Gary Myk, KA9SUN, 6520 W. 28th, Berwyn, IL 60402
July 26	Oshkosh, WI	Experimental Aircraft Association Fly-In Convention/Fox Cities ARC Wayne Pennings, WD9FLJ, 913 N. Mason St., Appleton, WI 54914
July 27	Texas City, TX	Tidelands ARS/ Carl (Bill) Steele, WA5WVP, PO Box 892, Texas City, TX 77592
July 27	Eau Claire, WI	Eau Claire Hamfest Assoc/ Liz Searing, N9EQR, 1129 McKinley Road, Eau Claire, WI 54701, (715)834-1303.
Jul 27-28	Atlanta, GA	Georgia State Convention/ Verne Fowler, W8BLA, 4343 Shallowford Rd Ste E6, Marietta, GA 30062.
Jul 27-28	Oklahoma City, OK	Central Oklahoma Radio Amateurs/ CORA Ham Holiday 1991, PO Box 95942, Oklahoma City, OK 73143-5942. Location: Oklahoma State Fair Park, Arts & Craft Bldg. 8am-??, \$8 admission, talk in on 147.03/63 simplex.
July 28	Baltimore, MD	BRATS Hamfest/ Mayer D. Zimmerman, W3GXX, PO Box 5915, Baltimore, MD 21208, (301)583-9147. Location: Maryland State Fairgrounds, York Road off I-83 and I-695, Set-up Sat 2pm, Sun 6am, talk in on 147.03 simplex./224.96 rptr
Jul 29- Aug 9	Leningrad, USSR	1991 Leningrad Hamvention Contact: AICEP, 10 Carvin, Suite 33, Kirkland, Quebec, Canada, H9H 4S4 for travel and tour information.
Aug 3-4	Jacksonville, FL	Greater Jacksonville Amateur Radio & Computer Show/ Billy Williams, N4UF PO Box 9673, Jacksonville, FL 32208, (904)766-2410 or (904)765-3230. Location: Osborn Convention Center, Sat 9am-5pm, Sun 9am-3pm, \$5 admission.
Aug 4	Randolph, OH	Portage Amateur Radio Club/Joanne Solak, KJ30 9971 Diagonal Rd., Mantua, OH 44255
Aug 4	Berryville, VA	Shenandoah Valley ARC/John Kanode, N4MM RFD #1, Box 73A, Boyce, VA 22620
Aug 4	Peotone, IL	Hamfesters Radio Club/Dave Brasel, NF9N 7528 W. 109th Pl., Worth, IL 60482
Aug 10	Huntington, WV	Tri-State Amateur Radio Association-Hamfest 91/Georgia, KA8QME (304)522-1811. Location: Ceredo-Kenova Community Center, 1200 Block of Oak St., just off Route 60, 8am, \$5 admission. Talk in 146.76.
Aug 10-11	Huntsville, AL	Huntsville Hamfest, Inc./Don Tunstill, WB4HOK 1215 Dale Dr. SE, Huntsville, AL 35801
Aug 10-11	High Point, NC	High Point ARC/Mark McMahan PO Box 1163, Janestown, NC 27282
Aug 11	Warrington, PA	Mid-Atlantic Amateur Radio Club Hamfest 91/AI Maslin, W3DZI (215)446-4936 Location: Bucks County Drive-In Theatre, US 611, 5 miles north of PA Tpke Exit 27 (Willow Grove), 8am, \$3 admission. Talk-in on 147.66/147.06 and 146.52.
Aug 17	Brewster, NY	PEARL, Putnam Emergency and Amateur Repeater League/ Joel Rappaport, WA2AWG, Box 216, RR2, No. White Rock Rd., Holmes, NY 12531, (914)855-1672.
Aug 18	Quincy, IL	Western Illinois ARC/Michael Nowack, NA9Q 2011 N. Sheridan, Quincy, IL 62301
Aug 23-25	Saginaw, MI	ARRL National Convention/Joel Turner, K8CQF 423 N. Granger, Saginaw, MI
Aug 25	Ft. Wayne, IN	Ft. Wayne ARC/Edwin Weinstein, WD9AYR Frank Jaworski, K1FJ 3923 Oakleaf Dr., Ft. Wayne, IN 46815

*Colorado Assoc of DXers, PO Box 22202, Denver, CO 80222-0202 for info

Monitoring Times is happy to run brief announcements of radio events open to our readers. Send your announcements at least 60 days before the event to: Monitoring Times Convention Calendar, PO Box 98, Brasstown, NC 28902.

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Closing Comments

Privacy Law May Be Amended

A Senate "Privacy and Technology Task Force" has recommended that the Electronic Communications Privacy Act of 1986 (ECPA) be amended to extend privacy protection to several devices previously exempted because of the ease by which they can be overheard, as well as to clarify the position of the government concerning hobby radio monitoring.

The Bad News

Proposed for inclusion under the new guidelines are cordless telephones, Special Mobile Radio systems (SMRs), wireless data communications (LANs), personal communications networks, radio PBXs, and CT2 (new cordless technology).

The government panel observed that more and more wireless communications are being utilized by Americans at home and at work, making them more and more vulnerable to intrusion by uninvited listeners.

The group recommends that manufacturers be required to provide adequate warning labels, notifying their customers that they may be overheard, and that encryption technologies should be encouraged.

The Good News

A strong recommendation is made that a more benign attitude be taken toward radio hobbyists, specifying that the purpose of the ECPA is to prevent "targeted surveillance of specific communications" by "government agents without a warrant, corporate spies, or just plain snoops".

Robert Horvitz, noted hobby radio advocate and recipient of the 1990 Monitoring Times award for his outstanding service to recreational monitoring, has responded to Senator Leahy, Chairman of the Task Force.

While expressing some relief that Congress may finally address the realities of what ECPA has wrought, he notes that there is

plenty of room for clarification, listing numerous inconsistencies and absurdities in the present draft of the Act.

So What Does All This Mean?

Four years ago, the recreational monitoring community--some 10-20 million strong--was caught off guard. The well-financed Cellular Telecommunications Industry Association (CTIA) lobby convinced a well-meaning Congress that it would be a good idea to legalize listening in on mobile telephones as well as several other modes of communications.

Since then, however, dozens of attorneys have come to the fore, indicating their willingness to challenge the ECPA in court on a variety of Constitutional grounds in an effort to change a bad law.

Even the times are changing; it may now be to the cellular industry's advantage to approve of recreational eavesdropping; after all, the more prospective customers fear being overheard, the more likely they will elect to invest in cellular's newer, more secure digital equipment!

We hope that Congress will seize this opportunity to vindicate the recreational hobbyist and return to the wisdom of the original law, Section 605 of the 1934 Communications Act, which, while recognizing that it is human nature to listen to others, prohibits repeating what was overheard or using that information for personal gain. It made good sense then and it makes good sense now.

Bob Grove, WA4PYQ
Publisher



Readers may wish to express their thoughts to Congress by writing either John Podesta, Chairman, Privacy and Technology Task Force, 424 C Street NE, Washington, DC 20002, or to Senator Patrick Leahy, Chairman, Subcommittee on Technology and the Law, 815 Hart Senate Office Building, Washington, DC 20510

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